SEQUENCE LISTING

<110> HOOK, Magnus

<120> BIOINFORMATIC METHOD FOR IDENTIFYING SURFACE-ANCHORED PROTEINS FROM GRAM-POSITIVE BACTERIA

<130> P07741US01/BAS

<140> 10/661809
<141> 2003-09-15

<150> 60/410303
<151> 2002-09-13

<160> 24

<170> PatentIn version 3.1

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<212> PRT
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Leu Pro Xaa Thr Gly
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Gln Glu Gln Thr Ala Lys Glu Asp Val Ala Asp Ser Ala Thr Ser Val
1   5   10   15

Gly Ala Ile Val Ser Ile Glu Lys Ala Glu Lys Asn Phe Val Ile Thr
            20   25   30

Tyr Ala Ser Gly Lys Lys Ala Gln Ile Ser Ile Leu Asn Asp His Leu
        35   40   45

Phe Arg Tyr His Leu Asp Pro Thr Gly Lys Phe Glu Glu Tyr Pro Thr
    50   55   60

```
Pro Asn Asp Pro Lys His Val Ala Lys Ile Thr Ala Lys Thr Met Ala
65              70              75                  80


Asp Tyr Gly Thr Gln Ala Phe Glu Gln Thr Asn Val Thr Asp Ser Gly
                85              90                  95


Asn Gln Phe Ile Leu Glu Asn Asn Gly Leu Lys Ile Met Phe Glu Lys
            100             105             110


Glu Ser Ala Leu Met Lys Val Leu Asp Lys Lys Lys Asn Gln Val Ile
            115             120             125


Leu Glu Glu Thr Ala Pro Leu Ser Phe Lys Asn Asp Lys Ala Thr Gln
    130             135             140


Thr Leu Lys Gln Ser Ser Gln Glu Asn Tyr Phe Gly Gly Gly Thr Gln
145             150             155                 160


Asn Gly Arg Phe Thr His Lys Gly Thr Ala Ile Gln Ile Val Asn Thr
                165             170             175


Asn Asn Trp Val Asp Gly Gly Val Ala Ser Pro Asn Pro Phe Tyr Trp
                180             185             190


Ser Thr Ala Gly Tyr Gly Val Val Arg Asn Thr Trp Lys Pro Gly Asn
            195             200             205


Tyr Asp Phe Gly Ser His Asp Pro Gln Lys Thr Thr Thr Thr His Glu
    210             215             220


Gly Thr Asp Phe Asp Ala Phe Tyr Phe Phe Asn Asp Ser Ser Ala Gly
225             230             235             240


Ile Leu Lys Asp Tyr Tyr Glu Leu Thr Gly Lys Pro Ala Leu Met Pro
            245             250             255


Glu Tyr Gly Phe Tyr Glu Ala His Leu Asn Ala Tyr Asn Arg Asp Tyr
            260             265             270


Trp Val Lys Val Ala Glu Gly Thr Ala Gly Ala Val Lys Phe Glu Asp
    275             280             285
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```
Gly Asn Phe Tyr Lys Glu Tyr Gln Pro Gly Asp Leu Gly Asn Leu Asn
    290                 295             300

Gly Thr Leu Glu Ser Leu Asn Gly Glu Lys Glu Asn Tyr Gln Phe Ser
305                 310             315                 320

Ala Arg Ala Val Ile Asp Arg Tyr Lys Lys Asn Asp Met Pro Leu Gly
            325             330                 335

Trp Phe Leu Pro Asn Asp Gly Tyr Gly Ala Gly Tyr Gly Gln Thr Asp
            340             345             350

Ser Leu Asp Gly Asp Val Gln Asn Leu Lys Glu Phe Thr Glu Tyr Ala
        355             360             365

Gln Ala Asn Gly Val Glu Val Gly Leu Trp Thr Gln Ser Asn Leu His
    370             375             380

Pro Ala Asp Pro Lys Asn Pro Lys Lys Gly Glu Arg Asp Ile Ala Lys
385             390             395                 400

Glu Val Ser Val Ala Gly Val Lys Ala Leu Lys Thr Asp Val Ala Trp
            405             410                 415

Val Gly Tyr Gly Tyr Ser Phe Gly Leu Asn Gly Val Glu Asp Ala Ala
            420             425             430

Asn Val Phe Val Lys Glu Thr Asp Gly Ala Val Arg Pro Met Ile Val
        435             440             445

Ser Leu Asp Gly Trp Ala Gly Thr Gln Arg His Ala Gly Ile Trp Thr
    450             455             460

Gly Asp Gln Thr Gly Gly Gln Trp Glu Tyr Ile Arg Phe His Ile Pro
465             470             475                 480

Thr Tyr Ile Gly Thr Ser Leu Ser Gly Gln Pro Asn Val Gly Ser Asp
            485             490                 495

Met Asp Gly Ile Phe Gly Gly Lys Asn Lys Glu Ile Asn Ile Arg Asp
            500             505             510
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Phe Gln Trp Lys Thr Phe Thr Pro Val Gln Leu Asn Met Asp Gly Trp
        515   520   525

Gly Ser Asn Pro Lys Thr Pro Phe Ala Phe Asp Gln Glu Ala Thr Asp
        530   535   540

Leu Asn Arg Ala Tyr Leu Lys Leu Lys Ser Met Met Met Pro Tyr Asn
545   550   555   560

Tyr Ser Ile Ala Lys Glu Ser Val Asp Gly Leu Pro Met Val Arg Ala
                565   570   575

Met Ala Leu Glu Phe Pro Asn Glu Gly Thr Ala Tyr Thr Lys Asp Ser
        580   585   590

Gln Tyr Gln Tyr Met Trp Gly Pro Asn Leu Leu Val Ala Pro Ile Tyr
        595   600   605

Asn Gly Asn Gln Asp Glu Ala Gly Asn Ser Ile Arg Asp Gly Ile Tyr
        610   615   620

Leu Pro Asp Glu Lys Gln Val Trp Val Asp Leu Phe Thr Gly Glu Lys
625   630   635   640

Tyr Gln Gly Gly Arg Val Leu Asn Gly Val Lys Thr Pro Leu Trp Lys
                645   650   655

Val Pro Val Phe Val Lys Asp Gly Ser Ile Ile Pro Met Thr Asn Pro
                660   665   670

Asn Asn Asn Pro Lys Glu Ile Gln Arg Asp Gln Arg Ser Phe Leu Ile
        675   680   685

Tyr Pro Asn Gly Thr Thr Ser Phe Asn Met Tyr Glu Asp Asp Gly Ile
        690   695   700

Ser Thr Ser Tyr Glu Ala Gly Gln Ser Ala Thr Thr Lys Ile Asn Ser
705   710   715   720

Gln Gly Pro Lys Ser Asn Glu Lys Gly Asp Leu Thr Val Thr Ile Glu
                725   730   735

Pro Thr Lys Gly Ser Tyr Lys Asp Phe Val Asp Glu Arg Ser Thr Thr

Leu Asp Leu Leu Ala Ser Glu Ala Pro Glu Ser Val Thr Ala Met Val
        755   760   765

Gly Gly Thr Glu Val Thr Leu Lys Gln
    770   775

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<212>   PRT
<213>   Staphylococcus epidermidis

<400>   3

Ala Ala Asn Lys Glu Glu Phe Leu Ala Gly Thr Asn Leu Tyr Tyr Phe
1   5   10   15

Asp Lys Glu Phe Gln Val Asn Gln Tyr Leu Ser Glu Ala Ser Gly Glu
            20   25   30

Lys Leu Asn Gln Ser Ala Leu Ser Val Lys Leu Ala Lys Gln Ser Val
        35   40   45

Thr Ala Lys Asp Val Gln Ile Thr Val Lys Gly Phe Ile Asn Lys Gly
    50   55   60

Thr Val Asp Gly Gly Asn Thr Thr Val Asp Asp Gln Leu Thr Ile Pro
65   70   75   80

Ala Asn Val Ala Ile Asn Glu Glu Lys Thr Thr Pro Ser Ser Leu Thr
            85   90   95

Leu Gln Trp Asp Gln Val Thr Glu Ala Thr Ser Tyr Glu Val Glu Arg
            100   105   110

Asp Gly Thr Val Phe Gly Asn Ile Gln Thr Asn Thr Ala Thr Phe Asp
        115   120   125

Gly Phe Ser Phe Leu Ser Glu His Thr Phe Arg Val Arg Ala Val Gly
        130   135   140

Lys Asn Gly Val Ser Glu Trp Ser Glu Pro Ile Lys Gly Lys Thr Gln
145   150   155   160

```
Asp Asp Pro Tyr Lys Glu Thr Ile Asn Gln Val Lys Ala Thr Ser Asn
            165                 170                 175

Leu Pro Glu Gln Pro Gly Ala Glu Leu Lys Lys Leu Thr Asp Lys Asp
            180                 185                 190

Leu Ser Thr Gly Trp His Thr Asn Trp Ser Thr Gly Ile Ala Asn Pro
            195                 200                 205

Ser Asp Gly Asn Phe Leu Ser Leu Lys Phe Asp Leu Gly Ala Glu Tyr
    210                 215                 220

Gln Met Asp Lys Ile Glu Tyr Leu Pro Arg Asp Asn Ala Gly Asn Gly
225                 230                 235                 240

Asn Ile Leu Gln Leu Gln Tyr Arg Thr Ser Lys Asp Gly Ala Asn Trp
            245                 250                 255

Thr Glu Phe Ser Glu Pro Ile Asn Trp Lys Gln Asp Ala Leu Thr Lys
            260                 265                 270

Thr Ile Glu Thr Lys Asp Gln Ala Tyr Arg Phe Val Glu Met Lys Val
            275                 280                 285

Leu Lys Ser Val Gly Asn Phe Gly Ser Gly Arg Glu Met Leu Phe Tyr
    290                 295                 300

Lys Gln Pro Gly Thr Glu Gly Ile Leu His Gly Asp Ile Thr Asn Asp
305                 310                 315                 320

Gly Thr Ile Asp Glu Asn Asp Ala Met Ser Tyr Arg Asn Tyr Thr Gly
            325                 330                 335

Leu Glu Ser Val Asp Ser Asp Phe Asn Gly Tyr Val Glu Lys Gly Asp
            340                 345                 350

Leu Asn Lys Asn Gly Val Ile Asp Ala Tyr Asp Ile Ser Tyr Val Leu
            355                 360                 365

Arg Gln Leu Asp Gly Gly Ile Glu Ile Pro Asp Val Glu Glu Ile Ala
    370                 375                 380
```

Gly Gly Leu Ser Leu Ala Val Val Asn Glu Asn Gly Lys Asp Thr Tyr
385   390   395   400

Leu Pro Gly Asp Thr Leu Thr Phe Ile Leu Lys Gly Gln Asp Leu Lys
                405   410   415

Asn Ile Asn Ala Leu Ser Thr Lys Met Ser Phe Asp Ser Ser Lys Phe
                420   425   430

Glu Leu Val Gly Gln Pro Ala Thr Thr Asn Asn Thr Gln Gln Met Glu
                435   440   445

Asn Tyr Ser Lys Tyr Arg Lys His Ser Asn Asp Val Glu Asn Leu Tyr
        450   455   460

Leu Val Leu Ser Asn Gln Gly Asn Lys Gln Leu Leu Asn Gly Ser Met
465   470   475   480

Asp Leu Val Thr Phe Lys Val Lys Val Lys Glu Thr Thr Arg Val Lys
                485   490   495

Arg Ala Thr Thr Val Glu Gln Pro Leu Gln Phe Asp Met Ser Gln Gly
        500   505   510

Leu Leu Val Gly Gln Gly Phe Gln Gln Ala Thr Leu Ser Asp Phe Ser
        515   520   525

Val Thr Val Lys Pro Thr Glu Leu Val Asp Lys Glu Leu Leu Gln Ala
    530   535   540

Leu Ile Thr Leu Asn Gln Ala Arg Val Glu Lys Glu Tyr Thr Pro Glu
545   550   555   560

Thr Trp Ala Ile Phe Lys Pro Ile Leu Asp Glu Ala Val Ala Val Leu
                565   570   575

Ala Asn Glu Gln Ala Thr Gln Thr Asp Val Ser Ala Ala Ala Glu Asn
                580   585   590

Leu Glu Lys Ala Ala Ser Gln Leu Glu Lys Met Pro Asp Val Ala Asn
        595   600   605

Lys Ala Asp Leu Glu Lys Ala Ile Gln Glu Gly Leu Ala Lys Lys Pro

```
              610                     615                     620

Ser Asp Gly Gln Glu Phe Thr Glu Glu Thr Lys Lys Val Leu Glu Glu
625                     630                     635                     640


Ser Leu Ala Ala Ala Gln Lys Val Phe Ala Gln Glu Lys Val Thr Gln
                    645                     650                     655


Glu Glu Ile Asp Gln Ala Thr Lys Thr Leu Arg Glu Ala Ile Ala Gln
                    660                     665                     670


Leu Lys Glu Gln Pro Val Ala Val Asp Lys Glu Thr Leu Lys Glu Gln
                    675                     680                     685


Ile Ala Gln Ala Arg Gly Arg Lys Pro Glu Glu Gly Tyr Gln Phe Thr
        690                     695                     700


Lys Glu Thr Glu Lys Gln Leu Gln Glu Ala Ile Gln Ala Ala Glu Ala
705                     710                     715                     720


Ile Val Ala Lys Glu Thr Ala Thr Lys Glu Glu Val Ser Glu Ala Leu
                    725                     730                     735


Asn Ala Leu Glu Thr Ala Met Ala Gln Leu Lys Glu Val Pro Leu Val
                    740                     745                     750


Asn Lys Asp Gln Leu Gln Glu Val Val Lys Arg Ala Gln Gln Val Thr
                    755                     760                     765


Pro Ser Glu Gly His Gln Phe Thr Ala Ser Ser Leu Gln Glu Leu Gln
        770                     775                     780


Lys Ala Leu Leu Ala Ala Lys Asn Thr Leu Lys Asn Pro Ala Ala Asn
785                     790                     795                     800


Gln Lys Met Ile Asp Glu Ala Val Ala Glu Leu Thr Ser Ala Ile Asp
                    805                     810                     815


Gly Leu Gln Glu Glu Val Leu Val Thr Asp Lys Lys Ala Leu Glu Ala
                    820                     825                     830


Met Ile Ala Lys Ala Lys Ala Ile Lys Pro Ser Ala Gly Lys Glu Phe
        835                     840                     845
```

```
Thr Ser Glu Ser Lys Ala Arg Leu Thr Glu Ala Ile Asp Gln Ala Glu
    850                 855                 860

Gly Ile Leu Ala Asp Lys Asn Ala Arg Gln Glu Gln Ile Asp Ile Ala
865                 870                 875                 880

Glu Lys Asn Val Lys Thr Ala Leu Asp Ser Leu Glu Glu Gln Val Leu
                885                 890                 895

Gln Thr Asp Lys Thr Lys Leu Lys Glu Leu Leu Gln Lys Ala Glu Thr
                900                 905                 910

Leu Lys Pro Lys Ala Gly Lys Gln Phe Thr Lys Ala Ser Gln Glu Ala
            915                 920                 925

Leu Ala Glu Ala Ile Lys Gln Ala Lys Ala Leu Val Glu Asp Pro Asn
    930                 935                 940

Ala Thr Gln Glu Ala Val Asp Lys Cys Leu Ser Ile Leu Ser Gln Ala
945                 950                 955                 960

Ile Glu Ala Met Ala Glu Glu Pro Ile Ser Ser Asn Ser Thr Gly Asn
                965                 970                 975

Asn Gly Asn His Ser Thr Val Ser Gly Thr Gly Gly Val Thr Ser Gln
                980                 985                 990

Gly Lys Gly Thr Ala Thr Gly Gly  Thr Thr Thr Lys Thr  Thr Thr Ser
            995                 1000                1005

Gly Thr
    1010


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<212> PRT
<213> Staphylococcus epidermidis

<400> 4

Glu Glu Val Asn Ser Asp Gly Gln Leu Thr Leu Gly Glu Val Lys Gln
1               5                   10                  15
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Thr Ser Gln Gln Glu Met Thr Leu Ala Leu Gln Gly Lys Ala Gln Pro
20   25   30

Val Thr Gln Glu Val Val Val His Tyr Ser Ala Asn Val Ser Ile Lys
        35   40   45

Ala Ala His Trp Ala Ala Pro Asn Asn Thr Arg Lys Ile Gln Val Asp
    50   55   60

Asp Gln Lys Lys Gln Ile Gln Ile Glu Leu Asn Gln Gln Ala Leu Ala
65   70   75   80

Asp Thr Leu Val Leu Thr Leu Asn Pro Thr Ala Thr Glu Asp Val Thr
                85   90   95

Phe Ser Tyr Gly Gln Gln Gln Arg Ala Leu Thr Leu Lys Thr Gly Thr
            100   105   110

Asp Pro Thr Glu Ser Thr Ala Ile Thr Ser Ser Pro Ala Ala Ser Ala
        115   120   125

Asn Glu Gly Ser Thr Glu Glu Ala Ser Thr Asn Ser Ser Val Pro Arg
    130   135   140

Ser Ser Glu Glu Thr Val Ala Ser Thr Thr Lys Ala Ile Glu Ser Lys
145   150   155   160

Thr Thr Glu Ser Thr Thr Val Lys Pro Arg Val Ala Gly Pro Thr Asp
            165   170   175

Ile Ser Asp Tyr Phe Thr Gly Asp Glu Thr Thr Ile Ile Asp Asn Phe
            180   185   190

Glu Asp Pro Ile Tyr Leu Asn Pro Asp Gly Thr Pro Ala Thr Pro Pro
        195   200   205

Tyr Lys Glu Asp Val Thr Ile His Trp Asn Phe Asn Trp Ser Ile Pro
    210   215   220

Glu Asp Val Arg Glu Gln Met Lys Ala Gly Asp Tyr Phe Glu Phe Gln
225   230   235   240

Leu Pro Gly Asn Leu Lys Pro Asn Lys Pro Gly Ser Gly Asp Leu Val

Asp Ala Glu Gly Asn Val Tyr Gly Thr Tyr Thr Ile Ser Glu Asp Gly
        260   265   270

Thr Val Arg Phe Thr Phe Asn Glu Arg Ile Thr Ser Glu Ser Asp Ile
        275   280   285

His Gly Asp Phe Ser Leu Asp Thr His Leu Asn Asp Ser Asp Gly Arg
        290   295   300

Gly Pro Gly Asp Trp Val Ile Asp Ile Pro Thr Gln Glu Asp Leu Pro
305   310   315   320

Pro Val Val Ile Pro Ile Val Pro Asp Thr Glu Gln Gln Ile Asp Lys
                325   330   335

Gln Gly His Phe Asp Arg Thr Pro Asn Pro Ser Ala Ile Thr Trp Thr
                340   345   350

Val Asp Ile Asn Gln Ala Met Lys Asp Gln Thr Asn Pro Thr Val Thr
        355   360   365

Glu Thr Trp Pro Thr Gly Asn Thr Phe Lys Ser Val Lys Val Tyr Glu
        370   375   380

Leu Val Met Asn Leu Asp Gly Thr Ile Lys Glu Val Gly Arg Glu Leu
385   390   395   400

Ser Pro Asp Glu Tyr Thr Val Asp Lys Asn Gly Asn Val Thr Ile Lys
                405   410   415

Gly Asp Thr Asn Lys Ala Tyr Arg Leu Glu Tyr Gln Thr Thr Ile Asp
                420   425   430

Glu Ala Val Ile Pro Asp Gly Gly Gly Asp Val Pro Phe Lys Asn His
        435   440   445

Ala Thr Leu Thr Ser Asp Asn Asn Pro Asn Gly Leu Asp Ala Glu Ala
        450   455   460

Thr Val Thr Ala Thr Tyr Gly Lys Met Leu Asp Lys Arg Asn Ile Asp
465   470   475   480

```
Tyr Asp Glu Ala Asn Gln Glu Phe Thr Trp Glu Ile Asn Tyr Asn Tyr
            485                     490                 495


Gly Glu Gln Thr Ile Pro Lys Asp Gln Ala Val Ile Thr Asp Thr Met
            500                     505                 510


Gly Asp Asn Leu Thr Phe Glu Pro Asp Ser Leu His Leu Tyr Ser Val
            515                     520                 525


Thr Phe Asp Asp Lys Gly Asn Glu Val Val Gly Ala Glu Leu Val Glu
    530                     535                 540


Gly Lys Asp Tyr Lys Val Val Ile Asn Gly Asp Gly Ser Phe Ala Ile
545                 550                 555                     560


Asp Phe Leu His Asp Val Thr Gly Ala Val Lys Ile Asp Tyr Lys Thr
            565                     570                 575


Lys Val Asp Gly Ile Val Glu Gly Asp Val Ala Val Asn Asn Arg Val
            580                     585                 590


Asp Val Gly Thr Gly Gln His Ser Glu Asp Asp Gly Thr Ala Ser Gln
            595                     600                 605


Gln Asn Ile Ile Lys Asn Thr Gly Ala Val Asp Tyr Gln Asn Ser Thr
    610                     615                 620


Ile Gly Trp Thr Leu Ala Val Asn Gln Asn Asn Tyr Leu Met Glu Asn
625                 630                 635                     640


Ala Val Ile Thr Asp Thr Tyr Glu Pro Val Pro Gly Leu Thr Met Val
            645                     650                 655


Pro Asn Ser Leu Val Val Lys Asp Thr Thr Thr Gly Ala Gln Leu Thr
            660                     665                 670


Leu Gly Lys Asp Phe Met Val Glu Ile Thr Arg Asn Ala Asp Gly Glu
            675                     680                 685


Thr Gly Phe Lys Val Ser Phe Ile Gly Ala Tyr Ala Lys Thr Ser Asp
    690                     695                 700
```

Ala Phe His Ile Thr Tyr Thr Thr Phe Phe Asp Val Thr Glu Leu Asp
705   710   715   720

Ala Asn Asn Pro Ala Leu Asp His Tyr Arg Asn Thr Ala Ala Ile Asp
                725   730   735

Trp Thr Asp Glu Ala Gly Asn Asn His His Ser Glu Asp Ser Lys Pro
                740   745   750

Phe Lys Pro Leu Pro Ala Phe Asp Leu Asn Ala Gln Lys Ser Gly Val
            755   760   765

Tyr Asn Ala Val Thr Lys Glu Ile Thr Trp Thr Ile Ala Val Asn Leu
    770   775   780

Ser Asn Asn Arg Leu Val Asp Ala Phe Leu Thr Asp Pro Ile Leu Thr
785   790   795   800

Asn Gln Thr Tyr Leu Ala Gly Ser Leu Lys Val Tyr Glu Gly Asn Thr
                805   810   815

Lys Pro Asp Gly Ser Val Glu Lys Val Lys Pro Thr Gln Pro Leu Thr
            820   825   830

Asp Ile Thr Met Glu Glu Pro Ser Glu Lys Asn Gln Asn Thr Trp Arg
        835   840   845

Val Asp Phe Pro Asn Asp Ser Arg Thr Tyr Val Ile Glu Phe Lys Thr
    850   855   860

Ser Val Asp Glu Lys Val Ile Glu Gly Ser Ala Ser Tyr Asp Asn Thr
865   870   875   880

Ala Ser Tyr Thr Asn Gln Gly Ser Ser Arg Asp Val Thr Gly Lys Val
                885   890   895

Ser Ile Gln His Gly Gly Glu Ser Val Lys Lys Gly Gly Glu Tyr His
            900   905   910

Lys Asp Asp Pro Asp His Val Tyr Trp His Val Met Ile Asn Gly Ala
        915   920   925

```
Gln Ser Val Leu Asp Asp Val Val Ile Thr Asp Thr Pro Ser Pro Asn
    930                 935             940


Gln Val Leu Asp Pro Glu Ser Leu Val Ile Tyr Gly Thr Asn Val Thr
945             950             955                 960


Glu Asp Gly Thr Ile Thr Pro Asp Lys Ser Val Ile Leu Glu Glu Gly
                965             970             975


Lys Asp Tyr Thr Leu Glu Val Thr Thr Asp Asn Glu Thr Gly Gln Gln
            980             985             990


Lys Ile Val Val Lys Met Ala His  Ile Glu Ala Pro Tyr  Tyr Met Glu
        995             1000            1005


Tyr Arg  Ser Leu Val Thr Ser  Ser Ala Ala Gly Ser  Thr Asp Thr
    1010            1015            1020


Val Ser  Asn Gln Val Ser Ile  Thr Gly Asn Gly Ser  Glu Val Val
    1025            1030            1035


His Gly  Asp Asp Asn Gly Asp  Val Val Val Asp Ile  Asp His Ser
    1040            1045            1050


Gly Gly  His Ala Thr Gly Thr  Lys Gly Lys Ile Gln  Leu Lys Lys
    1055            1060            1065


Thr Ala  Met Asp Glu Thr Thr  Ile Leu Ala Gly Ala  His Phe Gln
    1070            1075            1080


Ile Trp  Asp Gln Ala Lys Thr  Gln Val Leu Arg Glu  Gly Thr Val
    1085            1090            1095


Asp Ala  Thr Gly Val Ile Thr  Phe Gly Gly
    1100            1105


<210>   5
<211>   999
<212>   PRT
<213>   Staphylococcus epidermidis

<400>   5

Glu Glu Ile Thr Asp Leu Phe Leu Gln Lys Glu Val Thr Tyr Ser Gly
1               5                   10                  15
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Val Glu Gly Gly Lys Ile Gly Glu Asn Trp Lys Tyr Pro Gln Phe Val
            20                  25                  30


Gly Glu Lys Ala Val Asp Gly Asp Glu Thr Thr Arg Trp Ser Ala Asp
            35                  40                  45


Lys Gln Asp Glu Gln Trp Leu Ile Val Asp Leu Gly Glu Val Lys Asn
        50                  55                  60


Ile Gly Glu Leu Val Leu Gln Leu His Ala Glu Ser Pro Val Tyr Glu
65                  70                  75                  80


Ile Leu Val Ser Thr Asp Gly Glu Ser Tyr Gln Ser Ile Phe Lys Glu
                85                  90                  95


Glu Asn Gly Lys Gly Gly Gln Pro Thr Lys Lys Tyr Ile Asp Gly Asn
            100                 105                 110


Asn Val Gln Ala Arg Phe Val Lys Tyr Gln Gln Met Lys Met Trp Gln
            115                 120                 125


His Thr Asn Lys Gln Phe Tyr Ser Ser Ser Ile Ile Ser Phe Glu Ala
        130                 135                 140


Tyr Glu Lys Lys Arg Leu Pro Glu Ala Ile Lys Leu Leu Thr Glu Asn
145                 150                 155                 160


Leu Thr Ile Ser Glu Lys Arg Lys Gln Gln Leu Ala Phe Glu Val Ser
                165                 170                 175


Pro Ala Gly Val Asp Ile Thr Glu Asp Gln Ile Glu Trp Ser Ser Ser
            180                 185                 190


Asp Pro Thr Ile Val Thr Val Asp Gln Thr Gly Asn Leu Thr Ala Val
            195                 200                 205


Lys Ser Gly Glu Ala Lys Val Thr Val Lys Ile Lys Gly Thr Glu Ile
        210                 215                 220


Ser Asp Thr Ile Pro Val Thr Val Val Ala Glu Asn Lys Gln Tyr Ala
225                 230                 235                 240
```

```
Glu Met Arg Ala Lys Trp Lys Met Arg Leu Leu Gly Thr Thr Gln Tyr
            245             250                 255

Asp Asn Asp Ala Asp Val Gln Gln Tyr Arg Ala Gln Ile Ala Thr Glu
            260             265                 270

Ser Leu Ala Leu Trp Gln Thr Leu Asn Gln Ala Ala Asp Arg Glu Tyr
            275             280                 285

Leu Trp Glu Arg Lys Pro Ser Asp Thr Val Ser Ala Asp Tyr Thr Thr
    290             295                 300

Gln Phe Thr Asn Ile Lys Lys Leu Ala Leu Gly Tyr Tyr Glu Pro Ser
305                 310             315                 320

Ser Glu Leu Phe Glu Lys Pro Glu Val Tyr Asp Ala Ile Val Lys Gly
            325             330                 335

Ile Glu Phe Met Ile Asp Thr Lys Lys Tyr Asn Gly Thr Tyr Tyr Thr
            340             345                 350

Gly Asn Trp Trp Asp Trp Gln Ile Gly Ser Ala Gln Pro Leu Thr Asp
            355             360                 365

Thr Leu Ile Leu Leu His Asp Asp Leu Leu Asn Thr Asp Ala Glu Lys
    370             375                 380

Leu Asn Lys Phe Thr Ala Pro Leu Met Leu Tyr Ala Lys Asp Pro Asn
385                 390             395                 400

Ile Gln Trp Pro Ile Tyr Arg Ala Thr Gly Ala Asn Leu Thr Asp Ile
            405             410                 415

Ser Ile Thr Val Leu Gly Thr Gly Leu Leu Leu Glu Asp Asn Gln Arg
            420             425                 430

Leu Val Gln Val Gln Glu Ala Val Pro Ser Val Leu Lys Ser Val Ser
            435             440                 445

Ser Gly Asp Gly Leu Tyr Pro Asp Gly Ser Leu Ile Gln His Gly Tyr
    450             455                 460
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```
Phe Pro Tyr Asn Gly Ser Tyr Gly Asn Glu Leu Leu Lys Gly Phe Gly
465                 470             475                 480

Arg Ile Gln Thr Ile Leu Gln Gly Ser Asp Trp Glu Met Asn Asp Pro
                485             490                 495

Asn Ile Ser Asn Leu Phe Asn Val Val Asp Lys Gly Tyr Leu Gln Leu
                500             505                 510

Met Val Asn Gly Lys Met Pro Ser Met Val Ser Gly Arg Ser Ile Ser
            515             520             525

Arg Ala Pro Glu Thr Asn Pro Phe Thr Thr Glu Phe Glu Ser Gly Lys
        530             535             540

Glu Thr Ile Ala Asn Leu Thr Leu Ile Ala Lys Phe Ala Pro Glu Asn
545                 550             555                 560

Leu Arg Asn Asp Ile Tyr Thr Ser Ile Gln Thr Trp Leu Gln Gln Ser
                565             570             575

Gly Ser Tyr Tyr His Phe Phe Lys Lys Pro Arg Asp Phe Glu Ala Leu
            580             585             590

Ile Asp Leu Lys Asn Val Val Asn Ser Ala Ser Pro Ala Gln Ala Thr
            595             600             605

Pro Met Gln Ser Leu Asn Val Tyr Gly Ser Met Asp Arg Val Leu Gln
        610             615             620

Lys Asn Asn Glu Tyr Ala Val Gly Ile Ser Met Tyr Ser Gln Arg Val
625                 630             635                 640

Gly Asn Tyr Glu Phe Gly Asn Thr Glu Asn Lys Lys Gly Trp His Thr
                645             650             655

Ala Asp Gly Met Leu Tyr Leu Tyr Asn Gln Asp Phe Ala Gln Phe Asp
            660             665             670

Glu Gly Tyr Trp Ala Thr Ile Asp Pro Tyr Arg Leu Pro Gly Thr Thr
            675             680             685

Val Asp Thr Arg Glu Leu Ala Asn Gly Ala Tyr Thr Gly Lys Arg Ser
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Pro Gln Ser Trp Val Gly Gly Ser Asn Asn Gly Gln Val Ala Ser Ile
705   710   715   720

Gly Met Phe Leu Asp Lys Ser Asn Glu Gly Met Asn Leu Val Ala Lys
                    725   730   735

Lys Ser Trp Phe Leu Leu Asp Gly Gln Ile Ile Asn Leu Gly Ser Gly
                    740   745   750

Ile Thr Gly Thr Thr Asp Ala Ser Ile Glu Thr Ile Leu Asp Asn Arg
                    755   760   765

Met Ile His Pro Gln Glu Val Lys Leu Asn Gln Gly Ser Asp Lys Asp
                    770   775   780

Asn Ser Trp Ile Ser Leu Ser Ala Ala Asn Pro Leu Asn Asn Ile Gly
785   790   795   800

Tyr Val Phe Pro Asn Ser Met Asn Thr Leu Asp Val Gln Ile Glu Glu
                    805   810   815

Arg Ser Gly Arg Tyr Gly Asp Ile Asn Glu Tyr Phe Val Asn Asp Lys
                    820   825   830

Thr Tyr Thr Asn Thr Phe Ala Lys Ile Ser Lys Asn Tyr Gly Lys Thr
                    835   840   845

Val Glu Asn Gly Thr Tyr Glu Tyr Leu Thr Val Val Gly Lys Thr Asn
                    850   855   860

Glu Glu Ile Ala Ala Leu Ser Lys Asn Lys Gly Tyr Thr Val Leu Glu
865   870   875   880

Asn Thr Ala Asn Leu Gln Ala Ile Glu Ala Gly Asn Tyr Val Met Met
                    885   890   895

Asn Thr Trp Asn Asn Asp Gln Glu Ile Ala Gly Leu Tyr Ala Tyr Asp
                    900   905   910

Pro Met Ser Val Ile Ser Glu Lys Ile Asp Asn Gly Val Tyr Arg Leu
                    915   920   925

Thr Leu Ala Asn Pro Leu Gln Asn Asn Ala Ser Val Ser Ile Glu Phe
    930   935   940

Asp Lys Gly Ile Leu Glu Val Val Ala Ala Asp Pro Glu Ile Ser Val
945   950   955   960

Asp Gln Asn Ile Ile Thr Leu Asn Ser Ala Gly Leu Asn Gly Ser Ser
                965   970   975

Arg Ser Ile Ile Val Lys Thr Thr Pro Glu Val Thr Lys Glu Ala Leu
                980   985   990

Glu Lys Leu Ile Gln Glu Gln
        995

<210>   6
<211>   741
<212>   PRT
<213>   Staphylococcus epidermidis

<400>   6

Gln Glu Val Thr Ser Asp Ala Glu Lys Thr Val Glu Lys Asp Gly Leu
1   5   10   15

Lys Val Ile Gly Lys Ile Glu Asp Thr Ser Ser Gln Glu Asp Ile Lys
                20   25   30

Thr Val Thr Tyr Glu Val Thr Asn Thr Arg Asp Val Pro Ile Lys Asp
        35   40   45

Leu Ile Leu Lys Gln Lys Asn Thr Asn Asp Ser Pro Ile Lys Phe Val
    50   55   60

Leu Asp Thr Leu Ser Glu Glu Arg Gly Pro Thr Ser Leu Glu Glu Gln
65   70   75   80

Ala Lys Val Glu Thr Asn Glu Lys Asp Gln Thr Thr Asp Ile Lys Leu
                85   90   95

Leu Asn Leu Gln Pro Asn Ser Thr Arg Lys Ile Thr Ile Asn Gly Gln
                100   105   110

```
Ile Thr Thr Lys Ala Ser Asn Lys Leu Leu Val Ser Val Leu Ile Glu
        115                 120                 125

Asp Asn Glu Lys Gly Thr Leu Val Ile Asp Leu Pro Ser Lys Asp Ile
        130                 135                 140

Leu Ala Asp Lys Glu Ser Val Ser Lys Glu Lys Gln Glu Thr Ser Glu
145                 150                 155                 160

Thr Lys Val Glu Asn Gln Ala Asn Glu Thr Ala Ser Ser Thr Asn Glu
                165                 170                 175

Met Thr Ala Thr Thr Ser Asn Glu Thr Lys Pro Glu Ala Gly Lys Ala
        180                 185                 190

Ile Glu Ser Ile Gln Glu Thr Ala Leu Thr Gln Ala Thr Glu Ser Pro
        195                 200                 205

Glu Gln Pro Pro Leu Lys Ala Gln Pro Thr Gly Pro Leu Val Pro Pro
    210                 215                 220

Thr Pro Gly Arg Gly Phe Asn Thr Pro Ile Tyr Gln Ser Val His Lys
225                 230                 235                 240

Gly Glu Leu Phe Ser Thr Gly Asn Thr Asn Leu Lys Ile Ala Asn Glu
                245                 250                 255

Asn Thr Ala Ala Ala Gln Thr Phe Leu Asn Thr Arg Gly Ala Ser Ser
        260                 265                 270

Gly Tyr Ala Ile Asn Asn Phe Pro Leu Glu Phe Ala Asp Val Asp Asn
        275                 280                 285

Asp Pro Asn Thr Tyr Asn Ser Ser Arg Ala Tyr Ile Asp Leu Asn Gly
        290                 295                 300

Ala Lys Glu Ile Ala Trp Ala Gly Leu Phe Trp Ser Ala Ser Arg Tyr
305                 310                 315                 320

Lys Gly Pro Ala Tyr Gly Thr Asn Leu Ser Asp Glu Glu Ile Ser Ala
                325                 330                 335

Pro Val Gln Phe Thr Thr Pro Asn Gly Thr Val Gln Arg Val Ser Pro
```

340   345   350

Gln Arg Tyr His Arg Ile Asp Gln Asp Ala Thr Asn Pro Gly Gln Arg
        355   360   365

Phe Gly Tyr Asn Asn Thr Gly Phe Ser Asn Tyr Ala Asp Val Thr Ser
        370   375   380

Ile Leu Gln Gly Asp Lys Ser Ala Thr Gly Ser Tyr Thr Leu Ala Asp
385   390   395   400

Ile Pro Met Thr Ser Ser Leu Asn Gly Gln Tyr Gln Tyr Tyr Asn Phe
                405   410   415

Ser Gly Trp Ser Leu Phe Val Val Thr Lys Asp Gln Ala Ser Lys Ser
            420   425   430

Arg Ala Phe Ser Ile Tyr Tyr Gly Ala Arg Gly Asn Ala Ala Gly Thr
        435   440   445

Asn Asn Glu Phe Thr Met Ser Asn Phe Leu Thr Ala Lys Gln Gly Asn
    450   455   460

Leu Asp Pro Ile Val Thr Trp Phe Thr Val Gln Gly Asp Lys Tyr Trp
465   470   475   480

Thr Gly Asp Asn Ala Gln Ile Lys Asn Ser Ala Gly Thr Trp Val Asn
                485   490   495

Ile Ser Asn Thr Leu Asn Pro Val Asn Asn Ala Met Asn Ala Thr Val
            500   505   510

Thr Asp Asn Asp Glu His Met Val Asp Lys Tyr Pro Gly Lys Phe Ala
        515   520   525

Pro Asp His Pro Asn Phe Leu Asp Ile Asp Ile Asp Arg Met Ala Ile
        530   535   540

Pro Glu Gly Val Leu Asn Ala Gly Gln Asn Gln Ile Asn Phe Arg Thr
545   550   555   560

Thr Ser Ser Gly Asp Asp Tyr Ser Thr Asn Ala Ile Gly Phe Ala Val
                565   570   575

```
Asn Ala Glu Thr Pro Glu Phe Glu Ile Lys Lys Glu Ile Val Glu Pro
            580                 585                 590

Lys Glu Thr Tyr Lys Val Gly Glu Thr Ile Thr Tyr Arg Val Ser Leu
            595                 600                 605

Lys Asn Thr Lys Ala Asp Ser Glu Ala Ile Asn Ser Val Ser Lys Asp
            610                 615                 620

Ala Leu Asp Gly Arg Leu Asn Tyr Leu Pro Gly Ser Leu Lys Ile Ile
625                 630                 635                 640

Ser Gly Pro Asn Ser Gly Glu Lys Thr Asp Ala Ser Gly Asp Asp Gln
                645                 650                 655

Ala Glu Tyr Asp Glu Thr Asn Lys Gln Ile Ile Val Arg Val Gly Asn
            660                 665                 670

Gly Ala Thr Ala Thr Gln Gly Gly Ser Tyr Lys Ala Asp Thr Ala Glu
            675                 680                 685

Thr Ile Tyr Glu Phe Lys Ala Arg Ile Asn Glu Arg Ala Lys Ala Asn
    690                 695                 700

Glu Leu Val Pro Asn Ser Ala Thr Val Glu Ala Val Asp Ile Leu Thr
705                 710                 715                 720

Ser Ala Lys Val Asn Glu Thr Ser Asn Ile Val Glu Ala Lys Ile Ala
                725                 730                 735

Asp Glu Gln Val Thr
                740


<210>  7
<211>  570
<212>  PRT
<213>  Staphylococcus epidermidis

<400>  7

Glu Thr Gly Tyr Ala Gln Thr Glu Pro Thr Ser Thr Ser Glu Thr Asn
1               5                   10                  15
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Gln Ile Ser Ala Thr Pro Asn Val Val Pro Arg Lys Gln Val Gly Asn
            20                  25                  30

Ile Val Thr Ala Ile Gln Leu Thr Asp Lys Glu Gly Asn Pro Leu Gly
            35                  40                  45

Thr Ile Asn Gln Tyr Thr Asp Ile Tyr Leu Arg Ile Glu Phe Asn Leu
    50                  55                  60

Pro Asp Asn Thr Val Asn Ser Gly Asp Thr Ser Val Ile Thr Leu Pro
65                  70                  75                  80

Glu Glu Leu Arg Leu Glu Lys Asn Met Thr Phe Asn Val Val Asp Asp
                85                  90                  95

Thr Gly Thr Val Val Ala Ile Ala Gln Thr Asp Val Ala Asn Lys Thr
                100                 105                 110

Val Thr Leu Thr Tyr Thr Asp Tyr Val Glu Asn His Ala Asn Ile Ser
            115                 120                 125

Gly Ser Leu Tyr Phe Thr Ser Leu Ile Asp Phe Glu Asn Val Glu Asn
    130                 135                 140

Glu Ser Lys Ile Pro Ile Tyr Val Thr Val Glu Gly Glu Lys Ile Phe
145                 150                 155                 160

Ala Gly Asp Leu Asp Tyr Gln Gly Glu Gly Asp Asp Val Asn Glu Lys
                165                 170                 175

Phe Ser Lys Tyr Ser Trp Phe Ile Glu Asp Asp Pro Thr Glu Ile Tyr
            180                 185                 190

Asn Val Leu Arg Ile Asn Pro Thr Gly Gln Thr Tyr Thr Asp Leu Glu
            195                 200                 205

Val Glu Asp Val Leu Lys Thr Glu Ser Leu Ser Tyr Met Lys Asp Thr
    210                 215                 220

Met Lys Ile Glu Arg Gly Gln Trp Thr Leu Asp Gly Asn Ala Ile Trp
225                 230                 235                 240

Gln Phe Thr Pro Glu Glu Asp Ile Thr Asp Gln Leu Ala Val Gln Tyr
```

Gly Pro Asp Asp Arg Asn Phe Ser Val His Phe Gly Asn Ile Gly Thr
        260   265   270

Asn Glu Tyr Arg Ile Thr Tyr Lys Thr Lys Ile Asp His Leu Pro Glu
        275   280   285

Lys Gly Glu Thr Phe Thr Asn Tyr Ala Lys Leu Thr Glu Asn Gln Thr
        290   295   300

Val Val Glu Glu Val Glu Val Ser Arg Val Ser Gln Thr Gly Gly Gly
305   310   315   320

Glu Ala Asn Gly Glu Gln Tyr Val Val Glu Ile His Lys Glu Asp Glu
                325   330   335

Ala Gly Gln Arg Leu Ala Gly Ala Glu Phe Glu Leu Ile Arg Asn Ser
                340   345   350

Thr Asn Gln Thr Val Ala Lys Ile Thr Thr Asp Gln Asn Gly Thr Ala
        355   360   365

Ile Val Lys Gly Leu Leu Lys Asp Asn Tyr Thr Leu Val Glu Thr Lys
        370   375   380

Ala Pro Thr Gly Tyr Gln Leu Ser Gln Asn Lys Ile Pro Ile Thr Pro
385   390   395   400

Glu Asp Phe Gly Lys Asn Leu Val Ala Leu Lys Thr Val Val Asn His
                405   410   415

Lys Ile Ser Tyr Gln Pro Val Ala Ala Ser Phe Leu Ala Gly Lys Val
                420   425   430

Leu Leu Gly Lys Pro Leu Lys Asp Ala Glu Phe Gln Phe Glu Leu Leu
        435   440   445

Asp Glu Lys Gly Thr Val Leu Glu Thr Val Ser Asn Asp Thr Leu Gly
        450   455   460

Lys Ile Gln Phe Ser Pro Leu Thr Phe Glu Thr Pro Gly Asn Tyr Gln
465   470   475   480

```
Tyr Thr Ile Arg Glu Val Asn Thr Gln Gln Thr Gly Val Ser Tyr Asp
            485                 490                 495


Thr His Asn Leu Gln Val Gln Val Thr Val Glu Ala Leu Leu Gly Asn
            500                 505                 510


Leu Val Ala Thr Thr Gln Tyr Asp Gly Gly Gln Val Phe Thr Asn His
            515                 520                 525


Tyr Thr Pro Glu Lys Pro Ile Glu Ser Thr Thr Pro Pro Thr Ser Gly
        530                 535                 540


Thr Thr Asp Thr Thr Thr Asn Ser Thr Thr Glu Thr Thr Ser Ile Thr
545                 550                 555                 560


Ile Glu Lys Gln Ala Ile Arg Asn Lys Glu
                565                 570
```

<210> 8
<211> 3309
<212> DNA
<213> Staphylococcus epidermidis

<400> 8

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atgataacag atgagaatga taaaacgaat attaatatcg agttaaatct tctcaaccaa      60

acagagcagc cattacaacg agaaattcaa ttgaaaaatg cacagttcat ggatactgct     120

gtaattgaaa aagacggata ttcttaccaa gtgactaatg gtacgcttta tctgactttg     180

gacgcacaag taaaaaagcc ggtacagctt tcgttagctg ttgagcaaag ttcgcttcaa     240

acagctcagc cacctaagtt attgtatgaa aacaacgaat atgatgtttc agttacttct     300

gaaaaaataa cagtagagga ttctgctaaa gaatcaactg aaccagaaaa aataactgta     360

ccagaaaata cgaaagaaac taacaaaaat gattcggctc cagaaaaaac agaacagccg     420

accgcaacag aagaggtaac caatccattt gcagaagcaa gaatggcgcc agctactttg     480

agagcgaatc tggcactgcc tttaattgca ccacaataca cgacggataa ttctgggact     540

tatccgacag ctaattggca gcccacaggc aatcaaaatg tgttaaacca tcaagggaat     600

aaagacggta gtgcacaatg ggacggccaa acgagttgga atggggaccc tactaatcgc     660

acaaattctt atattgagta tggcggtaca ggagaccaag ccgattatgc catccgaaaa     720

tatgctagag aaacaacaac accagggctt tttgatgtat atcttaatgt gcgtgggaat     780
```

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gttcagaaag aaatcacgcc attggatttg gtcttagtcg ttgactggtc cggtagtatg      840

aatgaaaaca atcggattgg tgaagttcaa aaaggagtga accgttttgt tgatacattg      900

gcagatagcg gtattaccaa taacatcaac atgggctatg ttggctactc aagtgacggt      960

tataataaca acgccattca aatggggccg tttgatacag tcaaaaatcc aattaaaaat     1020

attacgccaa gtagcactag aggaggaact ttcactcaaa aagcattaag agatgctggt     1080

gatatgttag caacgccaaa tggacataag aaagtcattg tacttttaac ggatggcgtc     1140

ccaaccttct cttataaagt gagtcgagtt caaacagagg cggatggtcg cttttacggg     1200

acacaattta cgaatcgaca agatcaacca ggtagcactt cttatatctc tggtagctat     1260

aatgcgccag atcaaaacaa tatcaataaa cggattaaca gtacgtttat cgccacgata     1320

ggtgaggcaa tggtcttaaa acaacgtggg attgaaatac atggattggg cattcaattg     1380

caaagcgatc cacgagctaa tttatctaaa caacaagttg aagataaaat gcgtgagatg     1440

gtgtcagccg atgaaaatgg agacctttat tatgaatccg cggattatgc accagacatt     1500

tctgattatt tagcgaaaaa agccgttcag atttcaggaa cggttgtaaa cggaaaagta     1560

gttgatccaa ttgctgaacc ttttaaatac gagccaaata cattatcaat gaaaagtgtg     1620

ggtcctgttc aggttcaaac attaccagaa gtgtcgctaa caggcgctac aattaatagt     1680

aatgagattt atttgggtaa agggcaagaa attcaaattc attatcaagt acgtattcaa     1740

acagagtcag aaaacttcaa acctgatttt tggtatcaaa tgaatggtcg gacaacgttt     1800

cagccattag ccacggcccc tgaaaaagtt gattttgggg ttccttcggg aaaagcacct     1860

ggcgtgaagt taaacgtgaa aaaaatctgg gaagagtatg atcaagaccc gacaagtcgg     1920

ccagataatg tgatttatga aattagtaga aagcaagtaa ctgacacagc caactggcaa     1980

actgggtata ttaaattatc aaaaccagaa aatgatacca gcaatagttg ggagcgcaaa     2040

aatgtaaccc aactttccaa aaccgcggat gaaagctatc aagaagttct tgggcttccc     2100

caatacaaca atcaaggaca agctttcaat tatcaaacaa cccgtgaatt agcagttcct     2160

ggttacagtc aagaaaaaat cgacgatact acttggaaaa acacgaagca gttcaagcca     2220

ttagatttaa aagtaatcaa aaattcttcc tcaggtgaga aaaacttagt gggagccgtc     2280

tttgaattga gtggtaaaaa tgttcaaaca acattagtgg acaataaaga tggtagctat     2340

tccttgccaa aagatgtgcg cctacaaaaa ggggaacgct atacattaac tgaagtaaaa     2400

gcacctgcag gacatgagtt aggcaagaaa acgacttggc aaattgaggt gagtgagcaa     2460
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ggcaaagtaa gcatcgatgg acaagaagtg accaccacaa atcaagttat tccattggaa    2520

attgaaaata aattttcttc tttgccaatc agaattagaa aatacaccat gcaaaatggc    2580

aaacaagtga acttagcaga ggcgactttt gcgttgcaaa gaaaaaatgc tcaaggaagt    2640

taccaaactg tggcaactca aaaaacagat actacaggat tgagctattt taaaattagt    2700

gaacctggtg agtatcgaat ggtggaacaa tcaggaccat taggctacga cactcttgct    2760

ggaaattatg aatttactgt tgataaatat gggaaaattc actatgcagg caaaaatatt    2820

gaagaaaatg cgccagaatg gacactgaca catcaaaata atttgaaacc ttttgactta    2880

acagttaata aaaaagccga taatcagacg ccacttaaag gagcgaaatt ccgtttaaca    2940

ggaccagata cggatattga attaccaaaa gatggcaaag aaacggatac ttttgttttt    3000

gaaaacttaa aaccagggaa atatgttcta acagaaacct ttacgccaga aggatatcag    3060

gggttaaaag aaccaatcga attaataatt cgtgaagatg gttcagtcac gatagatggg    3120

gaaaaagtag cagatgtttt aatttctgga gagaagaata atcaaattac tttagacgtt    3180

acgaaccaag caaaggttcc tttacctgaa actggtggca taggacgctt gtggttttac    3240

ttgatagcga ttagtacatt cgtgatagcg ggtgtttatc tctttattag acgaccagaa    3300

gggagtgtg                                                           3309
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<210> 9
<211> 1103
<212> PRT
<213> Staphylococcus epidermidis

<400> 9

Met Ile Thr Asp Glu Asn Asp Lys Thr Asn Ile Asn Ile Glu Leu Asn
1   5   10   15

Leu Leu Asn Gln Thr Glu Gln Pro Leu Gln Arg Glu Ile Gln Leu Lys
            20   25   30

Asn Ala Gln Phe Met Asp Thr Ala Val Ile Glu Lys Asp Gly Tyr Ser
        35   40   45

Tyr Gln Val Thr Asn Gly Thr Leu Tyr Leu Thr Leu Asp Ala Gln Val
    50   55   60

Lys Lys Pro Val Gln Leu Ser Leu Ala Val Glu Gln Ser Ser Leu Gln
65   70   75   80

```
Thr Ala Gln Pro Pro Lys Leu Leu Tyr Glu Asn Asn Glu Tyr Asp Val
            85                  90                  95

Ser Val Thr Ser Glu Lys Ile Thr Val Glu Asp Ser Ala Lys Glu Ser
            100             105                 110

Thr Glu Pro Glu Lys Ile Thr Val Pro Glu Asn Thr Lys Glu Thr Asn
            115                 120                 125

Lys Asn Asp Ser Ala Pro Glu Lys Thr Glu Gln Pro Thr Ala Thr Glu
    130                 135                 140

Glu Val Thr Asn Pro Phe Ala Glu Ala Arg Met Ala Pro Ala Thr Leu
145                 150                 155                 160

Arg Ala Asn Leu Ala Leu Pro Leu Ile Ala Pro Gln Tyr Thr Thr Asp
            165                 170                 175

Asn Ser Gly Thr Tyr Pro Thr Ala Asn Trp Gln Pro Thr Gly Asn Gln
            180                 185                 190

Asn Val Leu Asn His Gln Gly Asn Lys Asp Gly Ser Ala Gln Trp Asp
            195                 200                 205

Gly Gln Thr Ser Trp Asn Gly Asp Pro Thr Asn Arg Thr Asn Ser Tyr
    210                 215                 220

Ile Glu Tyr Gly Gly Thr Gly Asp Gln Ala Asp Tyr Ala Ile Arg Lys
225                 230                 235                 240

Tyr Ala Arg Glu Thr Thr Thr Pro Gly Leu Phe Asp Val Tyr Leu Asn
            245                 250                 255

Val Arg Gly Asn Val Gln Lys Glu Ile Thr Pro Leu Asp Leu Val Leu
            260                 265                 270

Val Val Asp Trp Ser Gly Ser Met Asn Glu Asn Asn Arg Ile Gly Glu
            275                 280                 285

Val Gln Lys Gly Val Asn Arg Phe Val Asp Thr Leu Ala Asp Ser Gly
    290                 295                 300
```

Ile Thr Asn Asn Ile Asn Met Gly Tyr Val Gly Tyr Ser Ser Asp Gly
305   310   315   320

Tyr Asn Asn Asn Ala Ile Gln Met Gly Pro Phe Asp Thr Val Lys Asn
            325   330   335

Pro Ile Lys Asn Ile Thr Pro Ser Ser Thr Arg Gly Gly Thr Phe Thr
            340   345   350

Gln Lys Ala Leu Arg Asp Ala Gly Asp Met Leu Ala Thr Pro Asn Gly
            355   360   365

His Lys Lys Val Ile Val Leu Leu Thr Asp Gly Val Pro Thr Phe Ser
    370   375   380

Tyr Lys Val Ser Arg Val Gln Thr Glu Ala Asp Gly Arg Phe Tyr Gly
385   390   395   400

Thr Gln Phe Thr Asn Arg Gln Asp Gln Pro Gly Ser Thr Ser Tyr Ile
            405   410   415

Ser Gly Ser Tyr Asn Ala Pro Asp Gln Asn Asn Ile Asn Lys Arg Ile
            420   425   430

Asn Ser Thr Phe Ile Ala Thr Ile Gly Glu Ala Met Val Leu Lys Gln
            435   440   445

Arg Gly Ile Glu Ile His Gly Leu Gly Ile Gln Leu Gln Ser Asp Pro
    450   455   460

Arg Ala Asn Leu Ser Lys Gln Gln Val Glu Asp Lys Met Arg Glu Met
465   470   475   480

Val Ser Ala Asp Glu Asn Gly Asp Leu Tyr Tyr Glu Ser Ala Asp Tyr
            485   490   495

Ala Pro Asp Ile Ser Asp Tyr Leu Ala Lys Lys Ala Val Gln Ile Ser
            500   505   510

Gly Thr Val Val Asn Gly Lys Val Val Asp Pro Ile Ala Glu Pro Phe
    515   520   525

Lys Tyr Glu Pro Asn Thr Leu Ser Met Lys Ser Val Gly Pro Val Gln

```
                530                    535                    540

Val Gln Thr Leu Pro Glu Val Ser Leu Thr Gly Ala Thr Ile Asn Ser
545                 550                 555                 560


Asn Glu Ile Tyr Leu Gly Lys Gly Gln Glu Ile Gln Ile His Tyr Gln
                565                 570                 575


Val Arg Ile Gln Thr Glu Ser Glu Asn Phe Lys Pro Asp Phe Trp Tyr
                580                 585                 590


Gln Met Asn Gly Arg Thr Thr Phe Gln Pro Leu Ala Thr Ala Pro Glu
            595                 600                 605


Lys Val Asp Phe Gly Val Pro Ser Gly Lys Ala Pro Gly Val Lys Leu
        610                 615                 620


Asn Val Lys Lys Ile Trp Glu Glu Tyr Asp Gln Asp Pro Thr Ser Arg
625                 630                 635                 640


Pro Asp Asn Val Ile Tyr Glu Ile Ser Arg Lys Gln Val Thr Asp Thr
                645                 650                 655


Ala Asn Trp Gln Thr Gly Tyr Ile Lys Leu Ser Lys Pro Glu Asn Asp
                660                 665                 670


Thr Ser Asn Ser Trp Glu Arg Lys Asn Val Thr Gln Leu Ser Lys Thr
            675                 680                 685


Ala Asp Glu Ser Tyr Gln Glu Val Leu Gly Leu Pro Gln Tyr Asn Asn
        690                 695                 700


Gln Gly Gln Ala Phe Asn Tyr Gln Thr Thr Arg Glu Leu Ala Val Pro
705                 710                 715                 720


Gly Tyr Ser Gln Glu Lys Ile Asp Asp Thr Thr Trp Lys Asn Thr Lys
                725                 730                 735


Gln Phe Lys Pro Leu Asp Leu Lys Val Ile Lys Asn Ser Ser Ser Gly
            740                 745                 750


Glu Lys Asn Leu Val Gly Ala Val Phe Glu Leu Ser Gly Lys Asn Val
        755                 760                 765
```

Gln Thr Thr Leu Val Asp Asn Lys Asp Gly Ser Tyr Ser Leu Pro Lys
    770   775   780

Asp Val Arg Leu Gln Lys Gly Glu Arg Tyr Thr Leu Thr Glu Val Lys
785   790   795   800

Ala Pro Ala Gly His Glu Leu Gly Lys Lys Thr Thr Trp Gln Ile Glu
                805   810   815

Val Ser Glu Gln Gly Lys Val Ser Ile Asp Gly Gln Glu Val Thr Thr
                820   825   830

Thr Asn Gln Val Ile Pro Leu Glu Ile Glu Asn Lys Phe Ser Ser Leu
        835   840   845

Pro Ile Arg Ile Arg Lys Tyr Thr Met Gln Asn Gly Lys Gln Val Asn
    850   855   860

Leu Ala Glu Ala Thr Phe Ala Leu Gln Arg Lys Asn Ala Gln Gly Ser
865   870   875   880

Tyr Gln Thr Val Ala Thr Gln Lys Thr Asp Thr Thr Gly Leu Ser Tyr
                885   890   895

Phe Lys Ile Ser Glu Pro Gly Glu Tyr Arg Met Val Glu Gln Ser Gly
                900   905   910

Pro Leu Gly Tyr Asp Thr Leu Ala Gly Asn Tyr Glu Phe Thr Val Asp
        915   920   925

Lys Tyr Gly Lys Ile His Tyr Ala Gly Lys Asn Ile Glu Glu Asn Ala
    930   935   940

Pro Glu Trp Thr Leu Thr His Gln Asn Asn Leu Lys Pro Phe Asp Leu
945   950   955   960

Thr Val Asn Lys Lys Ala Asp Asn Gln Thr Pro Leu Lys Gly Ala Lys
                965   970   975

Phe Arg Leu Thr Gly Pro Asp Thr Asp Ile Glu Leu Pro Lys Asp Gly
            980   985   990

```
Lys Glu Thr Asp Thr Phe Val Phe  Glu Asn Leu Lys Pro  Gly Lys Tyr
        995                   1000                    1005


Val Leu  Thr Glu Thr Phe Thr  Pro Glu Gly Tyr Gln  Gly Leu Lys
    1010                  1015                  1020


Glu Pro  Ile Glu Leu Ile Ile  Arg Glu Asp Gly Ser  Val Thr Ile
    1025                  1030                  1035


Asp Gly  Glu Lys Val Ala Asp  Val Leu Ile Ser Gly  Glu Lys Asn
    1040                  1045                  1050


Asn Gln  Ile Thr Leu Asp Val  Thr Asn Gln Ala Lys  Val Pro Leu
    1055                  1060                  1065


Pro Glu  Thr Gly Gly Ile Gly  Arg Leu Trp Phe Tyr  Leu Ile Ala
    1070                  1075                  1080


Ile Ser  Thr Phe Val Ile Ala  Gly Val Tyr Leu Phe  Ile Arg Arg
    1085                  1090                  1095


Pro Glu  Gly Ser Val
    1100


<210>  10
<211>  1428
<212>  DNA
<213>  Staphylococcus epidermidis

<400>  10
atgaaaaacg cacgttggtt aagtatttgc gtcatgctac tcgctctttt cgggttttca     60

cagcaagcat tagcagaggc atcgcaagca agcgttcaag ttacgttgca caaattattg    120

ttccctgatg gtcaattacc agaacagcag caaaacacag gggaagaggg aacgctgctt    180

caaaattatc ggggcttaaa tgacgtcact tatcaagtct atgatgtgac ggatccgttt    240

tatcagcttc gttctgaagg aaaaacggtc caagaggcac agcgtcaatt agcagaaacc    300

ggtgcaacaa atagaaaacc gatcgcagaa gataaaacac agacaataaa tggagaagat    360

ggagtggttt ctttttcatt agctagcaaa gattcgcagc aacgagataa agcctatttta   420

tttgttgaag cggaagcacc agaagtggta aaggaaaaag ctagcaacct agtagtgatt    480

ttgcctgttc aagatccaca agggcaatcg ttaacgcata ttcatttata tccaaaaaat    540
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gaagaaaatg cctatgactt accaccactt gaaaaaacgg tactcgataa gcaacaaggc   600

tttaatcaag gagagcacat taactatcag ttaacgactc agattccagc gaatatttta   660

ggatatcagg aattccgttt gtcagataag gcggatacaa cgttgacact tttaccagaa   720

tcaattgagg taaaagtggc tggaaaaaca gttactacag gttacacact gacgacgcaa   780

aagcatggat ttacgcttga tttttcaatt aaagacttac aaaactttgc aaatcaaaca   840

atgactgtgt cgtatcaaat gcgtttagaa aagaccgctg aacctgacac tgcgattaac   900

aacgaaggac aattagtcac ggacaaacat accttgacta aaagagccac agttcgtaca   960

ggcggcaagt cttttgtcaa agttgatagt gaaaatgcga aaatcacctt gccagaggct   1020

gtttttatcg tcaaaaatca agcgggggaa tacctcaatg aaacagcaaa cgggtatcgt   1080

tggcaaaaag aaaaagcatt agctaaaaaa ttcacgtcta atcaagccgg tgaattttca   1140

gttaaaggct aaaagatgg ccagtacttc ttggaagaaa tctctgcacc aaaaggttat   1200

cttctgaatc aaacagaaat tcctttacg gtgggaaaaa attcttatgc aacgaacgga   1260

caacgaacag caccgttaca tgtaatcaat aaaaaagtaa aagagtcagg cttcttacca   1320

aaaacaaatg aagaacgttc tatttggttg acgattgcag gcctgctaat cattgggatg   1380

gtagtcattt ggctatttta tcaaaaacaa aaaagaggag agagaaaa   1428

<210> 11
<211> 476
<212> PRT
<213> Staphylococcus epidermidis

<400> 11

Met Lys Asn Ala Arg Trp Leu Ser Ile Cys Val Met Leu Leu Ala Leu
1   5   10   15

Phe Gly Phe Ser Gln Gln Ala Leu Ala Glu Ala Ser Gln Ala Ser Val
            20   25   30

Gln Val Thr Leu His Lys Leu Leu Phe Pro Asp Gly Gln Leu Pro Glu
        35   40   45

Gln Gln Gln Asn Thr Gly Glu Glu Gly Thr Leu Leu Gln Asn Tyr Arg
    50   55   60

Gly Leu Asn Asp Val Thr Tyr Gln Val Tyr Asp Val Thr Asp Pro Phe
65   70   75   80

Tyr Gln Leu Arg Ser Glu Gly Lys Thr Val Gln Glu Ala Gln Arg Gln
                85   90   95

Leu Ala Glu Thr Gly Ala Thr Asn Arg Lys Pro Ile Ala Glu Asp Lys
                100   105   110

Thr Gln Thr Ile Asn Gly Glu Asp Gly Val Val Ser Phe Ser Leu Ala
            115   120   125

Ser Lys Asp Ser Gln Gln Arg Asp Lys Ala Tyr Leu Phe Val Glu Ala
    130   135   140

Glu Ala Pro Glu Val Val Lys Glu Lys Ala Ser Asn Leu Val Val Ile
145   150   155   160

Leu Pro Val Gln Asp Pro Gln Gly Gln Ser Leu Thr His Ile His Leu
                165   170   175

Tyr Pro Lys Asn Glu Glu Asn Ala Tyr Asp Leu Pro Pro Leu Glu Lys
                180   185   190

Thr Val Leu Asp Lys Gln Gln Gly Phe Asn Gln Gly Glu His Ile Asn
            195   200   205

Tyr Gln Leu Thr Thr Gln Ile Pro Ala Asn Ile Leu Gly Tyr Gln Glu
    210   215   220

Phe Arg Leu Ser Asp Lys Ala Asp Thr Thr Leu Thr Leu Leu Pro Glu
225   230   235   240

Ser Ile Glu Val Lys Val Ala Gly Lys Thr Val Thr Thr Gly Tyr Thr
                245   250   255

Leu Thr Thr Gln Lys His Gly Phe Thr Leu Asp Phe Ser Ile Lys Asp
            260   265   270

Leu Gln Asn Phe Ala Asn Gln Thr Met Thr Val Ser Tyr Gln Met Arg
            275   280   285

Leu Glu Lys Thr Ala Glu Pro Asp Thr Ala Ile Asn Asn Glu Gly Gln
    290   295   300

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Leu Val Thr Asp Lys His Thr Leu Thr Lys Arg Ala Thr Val Arg Thr
305                 310                 315                 320


Gly Gly Lys Ser Phe Val Lys Val Asp Ser Glu Asn Ala Lys Ile Thr
                325             `       330                 335


Leu Pro Glu Ala Val Phe Ile Val Lys Asn Gln Ala Gly Glu Tyr Leu
            340             345             350


Asn Glu Thr Ala Asn Gly Tyr Arg Trp Gln Lys Glu Lys Ala Leu Ala
            355             360             365


Lys Lys Phe Thr Ser Asn Gln Ala Gly Glu Phe Ser Val Lys Gly Leu
    370             375             380


Lys Asp Gly Gln Tyr Phe Leu Glu Glu Ile Ser Ala Pro Lys Gly Tyr
385             390             395             400


Leu Leu Asn Gln Thr Glu Ile Pro Phe Thr Val Gly Lys Asn Ser Tyr
            405             410             415


Ala Thr Asn Gly Gln Arg Thr Ala Pro Leu His Val Ile Asn Lys Lys
            420             425             430


Val Lys Glu Ser Gly Phe Leu Pro Lys Thr Asn Glu Glu Arg Ser Ile    '
    435             440             445


Trp Leu Thr Ile Ala Gly Leu Leu Ile Ile Gly Met Val Val Ile Trp
    450             455             460


Leu Phe Tyr Gln Lys Gln Lys Arg Gly Glu Arg Lys
465             470             475


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<212>   DNA
<213>   Staphylococcus epidermidis

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ctcgtgattc acaaaaagaa aatgacggat ttaccagatc cgcttattca aaatagcggg     180

aaagaaatga gcgagtttga taaatatcaa ggactggcag atgtgacgtt tagtatttat     240
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aacgtgacga acgaattta cgagcaacga gcggcaggcg caagcgttga tgcagctaaa      300

caagctgtcc aaagtttaac tcctgggaaa cctgttgctc aaggaaccac cgatgcaaat      360

gggaatgtca ctgttcagtt acctaaaaaa caaaatggta aagatgcagt gtataccatt      420

aaagaagaac caaaagaggg tgtagttgct gctacgaata tggtggtggc gttcccagtt      480

tacgaaatga tcaagcaaac agatggttcc tataaatatg aacagaaga attagcggtt      540

gttcatattt atcctaaaaa tgtggtagcc aatgatggta gtttacatgt gaaaaaagta      600

ggaactgctg aaaatgaagg attaaatggc gcagaatttg ttatttctaa aagcgaaggc      660

tcaccaggca cagtaaaata tatccaagga gtcaaagatg gattatatac atggacaacg      720

gataaagaac aagcaaaacg ctttattact gggaaaagtt atgaaattgg cgaaaatgat      780

ttcacagaag cagagaatgg aacgggagaa ttaacagtta aaaatcttga ggttggttcg      840

tatattttag aagaagtaaa agctccaaat aatgcagaat taattgaaaa tcaaacaaaa      900

acaccattta caattgaagc aaacaatcaa acacctgttg aaaaaacagt caaaaatgat      960

acctctaaag ttgataaaac aacaccaagc ttagatggta agatgtggc aattggcgaa     1020

aaaattaaat atcaaatttc tgtaaatatt ccattgggga ttgcagacaa agaaggcgac     1080

gctaataaat acgtcaaatt caatttagtt gataaacatg atgcagcctt aactttgat      1140

aacgtgactt ctggagagta tgcttatgcg ttatatgatg gggatacagt gattgctcct     1200

gaaaattatc aagtgactga acaagcaaat ggcttcactg tcgccgttaa tccagcgtat     1260

attcctacgc taacaccagg cggcacacta aaattcgttt actttatgca tttaaatgaa     1320

aaagcagatc ctacgaaagg ctttaaaaat gaggcgaatg ttgataacgg tcataccgac     1380

gaccaaacac caccaactgt tgaagttgtg acaggtggga acgtttcat taaagtcgat     1440

ggcgatgtga cagcgacaca agccttggcg ggagcttcct ttgtcgtccg tgatcaaaac     1500

agcgacacag caaattattt gaaaatcgat gaaacaacga agcagcaac ttgggtgaaa      1560

acaaaagctg aagcaactac ttttacaaca acggctgatg gattagttga tatcacaggg     1620

cttaaatacg gtacctatta tttagaagaa actgtagctc ctgatgatta tgtcttgtta     1680

acaaatcgga ttgaatttgt ggtcaatgaa caatcatatg gcacaacaga aaacctagtt     1740

tcaccagaaa aagtaccaaa caaacacaaa ggtaccttac cttcaacagg tggcaaagga     1800

atctacgttt acttaggaag tggcgcagtc ttgctactta ttgcaggagt ctactttgct     1860

agacgtagaa aagaaaatgc t                                              1881
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<211> 627
<212> PRT
<213> Staphylococcus epidermidis

<400> 13

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1   5   10   15

Ile Leu Pro Leu Phe Thr Ser Val Leu Gly Thr Thr Thr Ala Phe Ala
            20   25   30

Glu Glu Asn Gly Glu Ser Ala Gln Leu Val Ile His Lys Lys Lys Met
            35   40   45

Thr Asp Leu Pro Asp Pro Leu Ile Gln Asn Ser Gly Lys Glu Met Ser
        50   55   60

Glu Phe Asp Lys Tyr Gln Gly Leu Ala Asp Val Thr Phe Ser Ile Tyr
65   70   75   80

Asn Val Thr Asn Glu Phe Tyr Glu Gln Arg Ala Ala Gly Ala Ser Val
                85   90   95

Asp Ala Ala Lys Gln Ala Val Gln Ser Leu Thr Pro Gly Lys Pro Val
            100   105   110

Ala Gln Gly Thr Thr Asp Ala Asn Gly Asn Val Thr Val Gln Leu Pro
        115   120   125

Lys Lys Gln Asn Gly Lys Asp Ala Val Tyr Thr Ile Lys Glu Glu Pro
        130   135   140

Lys Glu Gly Val Val Ala Ala Thr Asn Met Val Val Ala Phe Pro Val
145   150   155   160

Tyr Glu Met Ile Lys Gln Thr Asp Gly Ser Tyr Lys Tyr Gly Thr Glu
                165   170   175

Glu Leu Ala Val Val His Ile Tyr Pro Lys Asn Val Val Ala Asn Asp
            180   185   190

Gly Ser Leu His Val Lys Lys Val Gly Thr Ala Glu Asn Glu Gly Leu

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           195                      200                      205


Asn Gly Ala Glu Phe Val Ile Ser Lys Ser Glu Gly Ser Pro Gly Thr
    210                     215                 220


Val Lys Tyr Ile Gln Gly Val Lys Asp Gly Leu Tyr Thr Trp Thr Thr
225                     230                 235                 240


Asp Lys Glu Gln Ala Lys Arg Phe Ile Thr Gly Lys Ser Tyr Glu Ile
                245                     250                 255


Gly Glu Asn Asp Phe Thr Glu Ala Glu Asn Gly Thr Gly Glu Leu Thr
                260                     265                 270


Val Lys Asn Leu Glu Val Gly Ser Tyr Ile Leu Glu Glu Val Lys Ala
            275                     280                 285


Pro Asn Asn Ala Glu Leu Ile Glu Asn Gln Thr Lys Thr Pro Phe Thr
    290                     295                 300


Ile Glu Ala Asn Asn Gln Thr Pro Val Glu Lys Thr Val Lys Asn Asp
305                     310                 315                 320


Thr Ser Lys Val Asp Lys Thr Thr Pro Ser Leu Asp Gly Lys Asp Val
                325                     330                 335


Ala Ile Gly Glu Lys Ile Lys Tyr Gln Ile Ser Val Asn Ile Pro Leu
                340                     345                 350


Gly Ile Ala Asp Lys Glu Gly Asp Ala Asn Lys Tyr Val Lys Phe Asn
            355                     360                 365


Leu Val Asp Lys His Asp Ala Ala Leu Thr Phe Asp Asn Val Thr Ser
    370                     375                 380


Gly Glu Tyr Ala Tyr Ala Leu Tyr Asp Gly Asp Thr Val Ile Ala Pro
385                     390                 395                 400


Glu Asn Tyr Gln Val Thr Glu Gln Ala Asn Gly Phe Thr Val Ala Val
                405                     410                 415


Asn Pro Ala Tyr Ile Pro Thr Leu Thr Pro Gly Gly Thr Leu Lys Phe
                420                     425                 430
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Val Tyr Phe Met His Leu Asn Glu Lys Ala Asp Pro Thr Lys Gly Phe
        435   440   445

Lys Asn Glu Ala Asn Val Asp Asn Gly His Thr Asp Asp Gln Thr Pro
        450   455   460

Pro Thr Val Glu Val Val Thr Gly Gly Lys Arg Phe Ile Lys Val Asp
465   470   475   480

Gly Asp Val Thr Ala Thr Gln Ala Leu Ala Gly Ala Ser Phe Val Val
                485   490   495

Arg Asp Gln Asn Ser Asp Thr Ala Asn Tyr Leu Lys Ile Asp Glu Thr
            500   505   510

Thr Lys Ala Ala Thr Trp Val Lys Thr Lys Ala Glu Ala Thr Thr Phe
        515   520   525

Thr Thr Thr Ala Asp Gly Leu Val Asp Ile Thr Gly Leu Lys Tyr Gly
        530   535   540

Thr Tyr Tyr Leu Glu Glu Thr Val Ala Pro Asp Asp Tyr Val Leu Leu
545   550   555   560

Thr Asn Arg Ile Glu Phe Val Val Asn Glu Gln Ser Tyr Gly Thr Thr
                565   570   575

Glu Asn Leu Val Ser Pro Glu Lys Val Pro Asn Lys His Lys Gly Thr
            580   585   590

Leu Pro Ser Thr Gly Gly Lys Gly Ile Tyr Val Tyr Leu Gly Ser Gly
            595   600   605

Ala Val Leu Leu Leu Ile Ala Gly Val Tyr Phe Ala Arg Arg Arg Lys
        610   615   620

Glu Asn Ala
625

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<211>   3387
<212>   DNA

<400> 14

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atttcagctg aagtcatttc ggatcagtct ggaaaaaaag cactgaacat caagctaaat   180

gcgaataaca ccagtgctga aaagatagaa aagaaattg gtctagtcga aaattactta    240

agtgatgtgg aaagaaaaga aggagatggc tatgcttatc aggtaaatag cgggaaaatt   300

acgttggaaa tctcatcaaa cactaaacaa actatcgatc tgagttttcc aatcgatcca   360

gcactttacc acagccaggc aaacaagctg atcgtcgata taaagaata tgacattatt    420

gatgagacag aaaataagaa agatacagat gtgtcagtac caaagccaga cgaaatagaa   480

gaagaatcat caaaagaaaa cgaaaattct gtcagcccat ttacattgcc tacattatcc   540

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caggcactt atcctaaagc cagttggcaa cctacaggaa atacaaatgt tcttgatcat    660

caaggcaata aaaacggaac aaatcaatgg atggtataa attcttggaa tggagatcct   720

aatgatcgga cccattcgta tatcgaatat ggaggaaccg gtaatcaagc agactatgcg   780

atacgaaagt atgcaaagga aacaagtaca cccggattgt ttgatgttta tttgaatgct   840

cgtggaaatg tacaaaaaga tatcacgcct cttgatctcg tattggtcgt agactggtca   900

ggaagtatga cgacaataa tcggatcggt gaagtaaaga ttggtgtcga tcgttttgtc    960

gatactttag cagatagcgg tatcacagac aaaatcaata tgggatatgt cggctactca  1020

agcgaaggat atagctacag taacggtgca gtacagatgg gttcatttga ttcagtgaaa  1080

aatcaagtaa atccattac accttcacgg acaaatggtg gtacttttac acaaaaagca   1140

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atctcaagaa tctatgatgc acctgaccaa aacaatctat ccagaagaat cgacagtacg  1380

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cttggcatcc aacttcaaag cgatccggca gctggtctct caaaagcaga agtagagtct  1500

cgtatgcgac aaatggtttc atcagatgaa aaaggcgatc tttactatga atcagctgat  1560

catgcaacag atatctctga ataccttagcc aaaaaagctg tacagatctc agcaactgta  1620
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agcaatggac aaataaatga tccaatcgca gaaccattca tttatcagcc tggtacactt     1680

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aataccatca agagcaatca gatctatttа ggaaaagacc aagaaatcca aatccattac     1800

caagtgagaa tccaaacaga aaatgaggac ttccatccaa atttctggta tcaaatgaac     1860

ggcaggacaa ctttccagcc aaacattgat accaatgaat tagctgaatt cggtatacca     1920

tctgctaaag ctcccggagt cagtcttcac atcaaaaagt tatgggaaga atttgacaac     1980

aatctagctg atcgtccaga tcaagttact tttgagattc aacgggaaca tacgacaaat     2040

gctgcagctt ggaaaaacgg atatattcga atcattaaac cagctaaaga tacaacaaat     2100

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gaattacctg taccaggata cgattctcaa caaatagatg caatgacatg gaaaaatact     2280

aaacaattca caccgttaaa cttgaaaata acgaaaaatt cctctacagg tgaaaaggat     2340

cttattggcg ctgttttcaa attaacagga gattctattg atactttact aacagatcat     2400

ggcgacggaa cctattctct tccagaaaat gtcaaattgc aaaaagaaat gacctatacg     2460

ctgacagaaa caaaagctcc agaagggcat ggattaagca aaaagactac ttgggaaatc     2520

aagatcgctt ctgatggtac ggtaaccatt gatggaaaaa cagtcactac ttccgatgat     2580

acgatccagt tgactattga aaatcctttt gttgaagttc ctgtagcagt acgtaagtat     2640

gcgatgcaag ggacggacaa agagataaat cttaaaggag cagcatttтc cctacagaaa     2700

aaagaagcaa atggtactta tcagccaatt gacagccaaa caacgaatga aaaaggtctt     2760

gccagttttg attcactcac acctggtaaa tatcgagtcg ttgaaacagc tggtcctgcc     2820

ggatatgata cttcgccggg aaattatgaa ttccaaatcg ataaatatgg aaaaatcatt     2880

tacacgggaa aaaataccga gatgacaaat aatgtatgga cgctcactca tcaaaatcga     2940

ctaaaagcgt ttgatctaac ggtacacaaa aaagaagaca acggacagac attaaaagga     3000

gcaaaattca gactgcaggg accagaaatg gacttagaat cgccaaaaga tggacaagaa     3060

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tcaattcaag tggatggaca agatcatgaa tctgttctgt caccaggagc caaaaacaac     3240

cagatttctt tagacatcac gaatcaggca aaagtaccat tacctgaaac gggaggaatt     3300

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<212>   PRT
<213>   Staphylococcus epidermidis

<400>   15

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1   5   10   15

Leu Ser Leu Ser Asn Phe Val Pro Leu Ser Ala Ile Ala Asp Thr Thr
            20   25   30

Asp Asp Pro Thr Val Leu Glu Thr Ile Ser Ala Glu Val Ile Ser Asp
        35   40   45

Gln Ser Gly Lys Lys Ala Leu Asn Ile Lys Leu Asn Ala Asn Asn Thr
    50   55   60

Ser Ala Glu Lys Ile Glu Lys Glu Ile Gly Leu Val Glu Asn Tyr Leu
65   70   75   80

Ser Asp Val Glu Arg Lys Glu Gly Asp Gly Tyr Ala Tyr Gln Val Asn
                85   90   95

Ser Gly Lys Ile Thr Leu Glu Ile Ser Ser Asn Thr Lys Gln Thr Ile
                100   105   110

Asp Leu Ser Phe Pro Ile Asp Pro Ala Leu Tyr His Ser Gln Ala Asn
        115   120   125

Lys Leu Ile Val Asp Asn Lys Glu Tyr Asp Ile Ile Asp Glu Thr Glu
    130   135   140

Asn Lys Lys Asp Thr Asp Val Ser Val Pro Lys Pro Asp Glu Ile Glu
145   150   155   160

Glu Glu Ser Ser Lys Glu Asn Glu Asn Ser Val Ser Pro Phe Thr Leu
                165   170   175

Pro Thr Leu Ser Leu Pro Ala Val Ser Val Pro Ser Asn Gln Thr Ile
            180   185   190

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Pro Thr Glu Tyr Thr Thr Asp Asp Gln Gly Thr Tyr Pro Lys Ala Ser
    195                     200             205

Trp Gln Pro Thr Gly Asn Thr Asn Val Leu Asp His Gln Gly Asn Lys
    210                 215             220

Asn Gly Thr Asn Gln Trp Asp Gly Ile Asn Ser Trp Asn Gly Asp Pro
225                 230             235                 240

Asn Asp Arg Thr His Ser Tyr Ile Glu Tyr Gly Gly Thr Gly Asn Gln
                245             250                 255

Ala Asp Tyr Ala Ile Arg Lys Tyr Ala Lys Glu Thr Ser Thr Pro Gly
            260             265             270

Leu Phe Asp Val Tyr Leu Asn Ala Arg Gly Asn Val Gln Lys Asp Ile
        275             280             285

Thr Pro Leu Asp Leu Val Leu Val Val Asp Trp Ser Gly Ser Met Asn
    290             295             300

Asp Asn Asn Arg Ile Gly Glu Val Lys Ile Gly Val Asp Arg Phe Val
305             310             315                 320

Asp Thr Leu Ala Asp Ser Gly Ile Thr Asp Lys Ile Asn Met Gly Tyr
            325             330             335

Val Gly Tyr Ser Ser Glu Gly Tyr Ser Tyr Ser Asn Gly Ala Val Gln
            340             345             350

Met Gly Ser Phe Asp Ser Val Lys Asn Gln Val Lys Ser Ile Thr Pro
        355             360             365

Ser Arg Thr Asn Gly Gly Thr Phe Thr Gln Lys Ala Leu Arg Asp Ala
    370             375             380

Gly Ser Met Leu Ser Val Pro Asn Gly His Lys Lys Val Ile Val Leu
385             390             395                 400

Leu Thr Asp Gly Val Pro Thr Phe Ser Tyr Lys Val Gln Arg Val His
            405             410             415
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Ala Gln Ser Ser Ser Asn Tyr Tyr Gly Thr Gln Phe Ser Asn Thr Gln
        420   425   430

Asp Arg Pro Gly Asn Thr Ser Leu Ile Ser Arg Ile Tyr Asp Ala Pro
        435   440   445

Asp Gln Asn Asn Leu Ser Arg Arg Ile Asp Ser Thr Phe Ile Ala Thr
    450   455   460

Ile Gly Glu Ala Met Ala Leu Lys Glu Arg Gly Ile Glu Ile His Gly
465   470   475   480

Leu Gly Ile Gln Leu Gln Ser Asp Pro Ala Ala Gly Leu Ser Lys Ala
            485   490   495

Glu Val Glu Ser Arg Met Arg Gln Met Val Ser Ser Asp Glu Lys Gly
        500   505   510

Asp Leu Tyr Tyr Glu Ser Ala Asp His Ala Thr Asp Ile Ser Glu Tyr
        515   520   525

Leu Ala Lys Lys Ala Val Gln Ile Ser Ala Thr Val Ser Asn Gly Gln
    530   535   540

Ile Asn Asp Pro Ile Ala Glu Pro Phe Ile Tyr Gln Pro Gly Thr Leu
545   550   555   560

Ser Val Lys Ser Val Gly Thr Ser Pro Thr Thr Val Thr Pro Ser Ile
            565   570   575

Ser Ile Glu Gly Asn Thr Ile Lys Ser Asn Gln Ile Tyr Leu Gly Lys
            580   585   590

Asp Gln Glu Ile Gln Ile His Tyr Gln Val Arg Ile Gln Thr Glu Asn
        595   600   605

Glu Asp Phe His Pro Asn Phe Trp Tyr Gln Met Asn Gly Arg Thr Thr
    610   615   620

Phe Gln Pro Asn Ile Asp Thr Asn Glu Leu Ala Glu Phe Gly Ile Pro
625   630   635   640

```
Ser Ala Lys Ala Pro Gly Val Ser Leu His Ile Lys Lys Leu Trp Glu
                645             650              655

Glu Phe Asp Asn Asn Leu Ala Asp Arg Pro Asp Gln Val Thr Phe Glu
                660             665              670

Ile Gln Arg Glu His Thr Thr Asn Ala Ala Ala Trp Lys Asn Gly Tyr
                675             680              685

Ile Arg Ile Ile Lys Pro Ala Lys Asp Thr Thr Asn Thr Trp Glu Arg
        690             695             700

Ala Asp Ile Asp Lys Leu Ser Ala Asn Ser Gly Glu Ser Tyr Gln Glu
705             710             715                 720

Ile Leu Ser Leu Pro Gln Tyr Asn Asn Gln Gly Gln Ala Phe Ser Tyr
                725             730             735

Gln Thr Ile Lys Glu Leu Pro Val Pro Gly Tyr Asp Ser Gln Gln Ile
            740             745             750

Asp Ala Met Thr Trp Lys Asn Thr Lys Gln Phe Thr Pro Leu Asn Leu
        755             760             765

Lys Ile Thr Lys Asn Ser Ser Thr Gly Glu Lys Asp Leu Ile Gly Ala
    770             775             780

Val Phe Lys Leu Thr Gly Asp Ser Ile Asp Thr Leu Leu Thr Asp His
785             790             795                 800

Gly Asp Gly Thr Tyr Ser Leu Pro Glu Asn Val Lys Leu Gln Lys Glu
            805             810             815

Met Thr Tyr Thr Leu Thr Glu Thr Lys Ala Pro Glu Gly His Gly Leu
            820             825             830

Ser Lys Lys Thr Thr Trp Glu Ile Lys Ile Ala Ser Asp Gly Thr Val
    835             840             845

Thr Ile Asp Gly Lys Thr Val Thr Thr Ser Asp Asp Thr Ile Gln Leu
    850             855             860

Thr Ile Glu Asn Pro Phe Val Glu Val Pro Val Ala Val Arg Lys Tyr
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Ala Met Gln Gly Thr Asp Lys Glu Ile Asn Leu Lys Gly Ala Ala Phe
                885   890   895

Ser Leu Gln Lys Lys Glu Ala Asn Gly Thr Tyr Gln Pro Ile Asp Ser
                900   905   910

Gln Thr Thr Asn Glu Lys Gly Leu Ala Ser Phe Asp Ser Leu Thr Pro
        915   920   925

Gly Lys Tyr Arg Val Val Glu Thr Ala Gly Pro Ala Gly Tyr Asp Thr
    930   935   940

Ser Pro Gly Asn Tyr Glu Phe Gln Ile Asp Lys Tyr Gly Lys Ile Ile
945   950   955   960

Tyr Thr Gly Lys Asn Thr Glu Met Thr Asn Asn Val Trp Thr Leu Thr
                965   970   975

His Gln Asn Arg Leu Lys Ala Phe Asp Leu Thr Val His Lys Lys Glu
            980   985   990

Asp Asn Gly Gln Thr Leu Lys Gly Ala Lys Phe Arg Leu Gln Gly Pro
        995   1000   1005

Glu Met Asp Leu Glu Ser Pro Lys Asp Gly Gln Glu Thr Asp Thr
    1010   1015   1020

Phe Leu Phe Glu Asn Leu Lys Pro Gly Thr Tyr Thr Leu Thr Glu
    1025   1030   1035

Thr Phe Thr Pro Glu Gly Tyr Gln Gly Leu Lys Glu Pro Val Thr
    1040   1045   1050

Ile Val Ile His Glu Asp Gly Ser Ile Gln Val Asp Gly Gln Asp
    1055   1060   1065

His Glu Ser Val Leu Ser Pro Gly Ala Lys Asn Asn Gln Ile Ser
    1070   1075   1080

Leu Asp Ile Thr Asn Gln Ala Lys Val Pro Leu Pro Glu Thr Gly
    1085   1090   1095

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Gly Ile  Gly Arg Leu Gly Ile  Tyr Leu Val Gly Met  Ile Gly Cys
    1100                1105                1110


Ala Phe  Ser Ile Trp Tyr Leu  Phe Leu Lys Lys Glu  Arg Gly Gly
    1115                1120                1125


Ser



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<212>  DNA
<213>  Staphylococcus epidermidis

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ttcccaaacg ggcaactgcc gaaaaatcat ccaaatgacg gacaagaaaa agctttatta   180

caaacgtatc gaggattaaa tggtgtcaca ttccaagttt atgatgtcac agattctttt   240

taccatctac gggaaaaggg caaaacggta gaagaagcac aagcagagat cgcaaaaaac   300

ggtgcgtctt ccggtatgtt taccgcagaa gcaacaacta caactcttaa caacgaagat   360

ggtatcgctt ctttttctct ggccgctaaa gatcaagaaa aagagataaa agcgtatctt   420

ttcattgaat ccaaagtacc agaagtcgtc aaagaaaagg cagagaatat ggtagttgtt   480

cttcctgtac atggacaaaa caatcaaaaa ctttcaacta tccatttgta tcctaaaaat   540

gaagaaaacg actaccctga tccacctttt gagaaggtat tagaagagcc tagaaatgat   600

tttacgattg gtgaaaaaat cacttattcc ttgcatacga caattcctgt aaatatcctt   660

gactatcaaa agttcgaatt gtcagatagt gcggatgaag cattaacgtt tttacctaat   720

agtttaacga tttcatcgaa tggagaaaag ctgacagaag ctttgtcat acacaagaaa   780

cctcacggat ttgatgtttt attttcgatc ccttcgttgg aaaaatatgc tggaaaaaaa   840

ctgaccattt cttatcagat gcagctaagc agtacagcac aggcgaacaa ggaaatcaac   900

aacaacggaa cactggattt tggttttggt gtcagtacaa agaaagtctc tgtatataca   960

gggagtaagc aatttgtcaa aatcgagaca aataaaccag ataaacgatt agctggcgca  1020

gtattcctta ttaaaaacaa agcaggaaat tacctccagc aaacagccaa cggatacaag  1080

tggacaaaga acgaatcaga tgcgcttcac ctgatttccg ataaaaatgg cgctttttca  1140
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attttaagtg aaacagaaat tccgtttacc atttcaactt ttctttctga ggataaagag      1260

gcggacagta tattgaaagt agtcaataaa aaagaaaata gccgtccatt tcttccaaaa      1320

acaaacgaaa cgaaaaatac acttttaggc gttgttggta tggtattcgc aagctttgca      1380

atctggttgt ttatcaaaaa aagaacagga gtgaaaaaat ga                         1422


<210>   17
<211>   473
<212>   PRT
<213>   Staphylococcus epidermidis

<400>   17

Met Lys Lys Leu Gly Trp Leu Ser Met Cys Leu Phe Leu Leu Leu Phe
1               5                   10                  15


Lys Pro Ala Phe Thr Gln Val Ala Thr Glu Thr Glu Thr Glu Met Val
            20                  25                  30


Gln Ile Thr Leu His Lys Leu Leu Phe Pro Asn Gly Gln Leu Pro Lys
        35                  40                  45


Asn His Pro Asn Asp Gly Gln Glu Lys Ala Leu Leu Gln Thr Tyr Arg
    50                  55                  60


Gly Leu Asn Gly Val Thr Phe Gln Val Tyr Asp Val Thr Asp Ser Phe
65                  70                  75                  80


Tyr His Leu Arg Glu Lys Gly Lys Thr Val Glu Glu Ala Gln Ala Glu
                85                  90                  95


Ile Ala Lys Asn Gly Ala Ser Ser Gly Met Phe Thr Ala Glu Ala Thr
            100                 105                 110


Thr Thr Thr Leu Asn Asn Glu Asp Gly Ile Ala Ser Phe Ser Leu Ala
        115                 120                 125


Ala Lys Asp Gln Glu Lys Arg Asp Lys Ala Tyr Leu Phe Ile Glu Ser
    130                 135                 140


Lys Val Pro Glu Val Val Lys Glu Lys Ala Glu Asn Met Val Val Val
145                 150                 155                 160
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Leu Pro Val His Gly Gln Asn Asn Gln Lys Leu Ser Thr Ile His Leu
            165                 170                 175


Tyr Pro Lys Asn Glu Glu Asn Asp Tyr Pro Asp Pro Pro Phe Glu Lys
            180                 185                 190


Val Leu Glu Glu Pro Arg Asn Asp Phe Thr Ile Gly Glu Lys Ile Thr
            195                 200                 205


Tyr Ser Leu His Thr Thr Ile Pro Val Asn Ile Leu Asp Tyr Gln Lys
    210                 215                 220


Phe Glu Leu Ser Asp Ser Ala Asp Glu Ala Leu Thr Phe Leu Pro Asn
225                 230                 235                 240


Ser Leu Thr Ile Ser Ser Asn Gly Glu Lys Leu Thr Glu Gly Phe Val
                245                 250                 255


Ile His Lys Lys Pro His Gly Phe Asp Val Leu Phe Ser Ile Pro Ser
            260                 265                 270


Leu Glu Lys Tyr Ala Gly Lys Lys Leu Thr Ile Ser Tyr Gln Met Gln
            275                 280                 285


Leu Ser Ser Thr Ala Gln Ala Asn Lys Glu Ile Asn Asn Asn Gly Thr
    290                 295                 300


Leu Asp Phe Gly Phe Gly Val Ser Thr Lys Lys Val Ser Val Tyr Thr
305                 310                 315                 320


Gly Ser Lys Gln Phe Val Lys Ile Glu Thr Asn Lys Pro Asp Lys Arg
                325                 330                 335


Leu Ala Gly Ala Val Phe Leu Ile Lys Asn Lys Ala Gly Asn Tyr Leu
            340                 345                 350


Gln Gln Thr Ala Asn Gly Tyr Lys Trp Thr Lys Asn Glu Ser Asp Ala
            355                 360                 365


Leu His Leu Ile Ser Asp Lys Asn Gly Ala Phe Ser Ile Ser Gly Leu
    370                 375                 380
```

```
Lys Thr Gly Ser Tyr Arg Leu Lys Glu Ile Glu Ala Pro Ser Gly Tyr
385                 390             395             400


Ile Leu Ser Glu Thr Glu Ile Pro Phe Thr Ile Ser Thr Phe Leu Ser
            405         410             415


Glu Asp Lys Glu Ala Asp Ser Ile Leu Lys Val Val Asn Lys Lys Glu
            420             425             430


Asn Ser Arg Pro Phe Leu Pro Lys Thr Asn Glu Thr Lys Asn Thr Leu
        435             440             445


Leu Gly Val Val Gly Met Val Phe Ala Ser Phe Ala Ile Trp Leu Phe
    450             455             460


Ile Lys Lys Arg Thr Gly Val Lys Lys
465             470


<210>    18
<211>    1878
<212>    DNA
<213>    Staphylococcus epidermidis

<400>    18
atgaaaaatc ataaaaaaat aaacgttatg ttaggagtcc ttttccttat tttaccatta      60

ctcacaaaca gcttcggcgc aaaaaaagtg tttgcagagg agacagcagc tcaagtcatc     120

cttcataaaa agaaaatgac tgatttaccc gatcctttaa tccaaaacag cgggaaagaa     180

atgagcgaat tcgatcaata ccaaggatta gccgatattt cattttcagt ttataacgtc     240

actcaagaat tttatgcgca acgagataaa ggagcgtccg tggatgcagc aaaacaagca     300

gtccagtctt tgactcctgg tacaccagtt gcttcaggaa cgacagatgc tgatggaaat     360

gtcactttat ctttacctaa aaaacaaaat gggaaagatg cagtctacac gatcaaagaa     420

gaaccaaaag acggagtgtc agctgccgca acatggtttt agctttccc tgtatatgag      480

atgatcaaac aagcagatgg ctcttataaa tacgggacag aagaactaga tactatccat     540

ctctacccta aaaatacagt cggtaatgat ggaacgttga aagttacaaa aatcggtact     600

gccgaaaacg aagcactaaa tggagcagaa tttattattt ctaaagaaga aggaacacca     660

agcgtcaaaa aatacatcca aagtgtcaca gatggattgt acacttggac aactgatcaa     720

accaaagcca acatttcat tactggtcat tcttatgaca tcggcaacaa tgactttgcc      780
```

```
Lys Thr Gly Ser Tyr Arg Leu Lys Glu Ile Glu Ala Pro Ser Gly Tyr
385                 390                 395                 400


Ile Leu Ser Glu Thr Glu Ile Pro Phe Thr Ile Ser Thr Phe Leu Ser
                405             410                 415


Glu Asp Lys Glu Ala Asp Ser Ile Leu Lys Val Val Asn Lys Lys Glu
                420             425                 430


Asn Ser Arg Pro Phe Leu Pro Lys Thr Asn Glu Thr Lys Asn Thr Leu
            435                 440                 445


Leu Gly Val Val Gly Met Val Phe Ala Ser Phe Ala Ile Trp Leu Phe
        450             455                 460


Ile Lys Lys Arg Thr Gly Val Lys Lys
465                 470


<210>   18
<211>   1878
<212>   DNA
<213>'  Staphylococcus epidermidis

<400>   18
atgaaaaatc ataaaaaaat aaacgttatg ttaggagtcc ttttccttat tttaccatta      60

ctcacaaaca gcttcggcgc aaaaaaagtg tttgcagagg agacagcagc tcaagtcatc     120

cttcataaaa agaaaatgac tgatttaccc gatcctttaa tccaaaacag cgggaaagaa     180

atgagcgaat tcgatcaata ccaaggatta gccgatattt cattttcagt ttataacgtc     240

actcaagaat tttatgcgca acgagataaa ggagcgtccg tggatgcagc aaaacaagca     300

gtccagtctt tgactcctgg tacaccagtt gcttcaggaa cgacagatgc tgatggaaat     360

gtcactttat ctttacctaa aaaacaaat gggaaagatg cagtctacac gatcaaagaa     420

gaaccaaaag acggagtgtc agctgccgca acatggtttt agctttccc tgtatatgag     480

atgatcaaac aagcagatgg ctcttataaa tacgggacag aagaactaga tactatccat     540

ctctacccta aaaatacagt cggtaatgat ggaacgttga aagttacaaa aatcggtact     600

gccgaaaacg aagcactaaa tggagcagaa tttattattt ctaaagaaga aggaacacca     660

agcgtcaaaa aatacatcca aagtgtcaca gatggattgt acacttggac aactgatcaa     720

accaaagcca aacatttcat tactggtcat tcttatgaca tcggcaacaa tgactttgcc     780
```

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gaggcatcta ttgaaaaagg ccagttgatc gttaatcatt tagaagttgg aaaatataat    840

ttagaagaag taaaagctcc tgataatgcg gaaatgattg aaaagcaaac aatcacgcct    900

tttgagatcc tggcaaatag ccaaacacca gtagaaaaga ccatcaaaaa tgatacgtct    960

aaagttgata aaacaacacc tcaattgaat ggaaaagatg tcgcaatcgg tgaaaaaatt   1020

caatatgaga tttctgtcaa tatcccatta ggtatcgctg ataaagaagg aacgcaaaac   1080

aagtacacaa cattcaaact tatcgatact catgacgctg ctttaacatt tgataatgat   1140

tcttcaggaa cgtatgctta tgccttatat gatggaaata agaaatcga cccagtaaat   1200

tattctgtca ctgagcaaac agacggattc acggtttcag ttgatccgaa ttatattcct   1260

tcattaactc ctggcggtac attgaaattc gtttactata tgcatttgaa cgaaaaagca   1320

gatccaacca aaggattttc taaccaagca aatgtcgata cgggcatac aaatgatcaa   1380

acaccaccgt cagtcgatgt cgttactggg ggcaaacgat ttgttaaagt agatggtgac   1440

gttacatcag accaaacact tgctggagca gaattcgtcg ttcgtgatca agatagtgac   1500

acagcgaaat atttatcgat cgacccatcc acaaaagccg tcagctgggt atcggcgaaa   1560

gaatcagcaa cggttttac aaccacaagt aacggtttaa tcgatgtgac aggtctaaaa   1620

tatggcacgt actatctgga agaaacgaaa gcgccagaaa aatatgttcc attaacaaac   1680

cgtgtagcat ttactatcga tgaacaatct tatgtaacag caggacagtt gatttctcct   1740

gaaaaaatac caaataaaca caaaggtaca cttccttcaa caggcggtaa gggaatctat   1800

gtgtatatcg gtgcaggagt agtccttcta ctgattgctg gactgtactt tgctagacgc   1860

aagcacagtc agatttag                                                 1878
```

<210> 19
<211> 625
<212> PRT
<213> Staphylococcus epidermidis

<400> 19

```
Met Lys Asn His Lys Lys Ile Asn Val Met Leu Gly Val Leu Phe Leu
1               5                   10                  15


Ile Leu Pro Leu Leu Thr Asn Ser Phe Gly Ala Lys Lys Val Phe Ala
            20                  25                  30


Glu Glu Thr Ala Ala Gln Val Ile Leu His Lys Lys Lys Met Thr Asp
        35                  40                  45
```

Leu Pro Asp Pro Leu Ile Gln Asn Ser Gly Lys Glu Met Ser Glu Phe
    50   55   60

Asp Gln Tyr Gln Gly Leu Ala Asp Ile Ser Phe Ser Val Tyr Asn Val
65   70   75   80

Thr Gln Glu Phe Tyr Ala Gln Arg Asp Lys Gly Ala Ser Val Asp Ala
            85   90   95

Ala Lys Gln Ala Val Gln Ser Leu Thr Pro Gly Thr Pro Val Ala Ser
        100   105   110

Gly Thr Thr Asp Ala Asp Gly Asn Val Thr Leu Ser Leu Pro Lys Lys
        115   120   125

Gln Asn Gly Lys Asp Ala Val Tyr Thr Ile Lys Glu Glu Pro Lys Asp
    130   135   140

Gly Val Ser Ala Ala Ala Asn Met Val Leu Ala Phe Pro Val Tyr Glu
145   150   155   160

Met Ile Lys Gln Ala Asp Gly Ser Tyr Lys Tyr Gly Thr Glu Glu Leu
            165   170   175

Asp Thr Ile His Leu Tyr Pro Lys Asn Thr Val Gly Asn Asp Gly Thr
            180   185   190

Leu Lys Val Thr Lys Ile Gly Thr Ala Glu Asn Glu Ala Leu Asn Gly
        195   200   205

Ala Glu Phe Ile Ile Ser Lys Glu Glu Gly Thr Pro Ser Val Lys Lys
    210   215   220

Tyr Ile Gln Ser Val Thr Asp Gly Leu Tyr Thr Trp Thr Thr Asp Gln
225   230   235   240

Thr Lys Ala Lys His Phe Ile Thr Gly His Ser Tyr Asp Ile Gly Asn
            245   250   255

Asn Asp Phe Ala Glu Ala Ser Ile Glu Lys Gly Gln Leu Ile Val Asn
        260   265   270

His Leu Glu Val Gly Lys Tyr Asn Leu Glu Glu Val Lys Ala Pro Asp
        275   280   285

Asn Ala Glu Met Ile Glu Lys Gln Thr Ile Thr Pro Phe Glu Ile Leu
        290   295   300

Ala Asn Ser Gln Thr Pro Val Glu Lys Thr Ile Lys Asn Asp Thr Ser
305   310   315   320

Lys Val Asp Lys Thr Thr Pro Gln Leu Asn Gly Lys Asp Val Ala Ile
        325   330   335

Gly Glu Lys Ile Gln Tyr Glu Ile Ser Val Asn Ile Pro Leu Gly Ile
        340   345   350

Ala Asp Lys Glu Gly Thr Gln Asn Lys Tyr Thr Thr Phe Lys Leu Ile
        355   360   365

Asp Thr His Asp Ala Ala Leu Thr Phe Asp Asn Asp Ser Ser Gly Thr
        370   375   380

Tyr Ala Tyr Ala Leu Tyr Asp Gly Asn Lys Glu Ile Asp Pro Val Asn
385   390   395   400

Tyr Ser Val Thr Glu Gln Thr Asp Gly Phe Thr Val Ser Val Asp Pro
                405   410   415

Asn Tyr Ile Pro Ser Leu Thr Pro Gly Gly Thr Leu Lys Phe Val Tyr
                420   425   430

Tyr Met His Leu Asn Glu Lys Ala Asp Pro Thr Lys Gly Phe Ser Asn
        435   440   445

Gln Ala Asn Val Asp Asn Gly His Thr Asn Asp Gln Thr Pro Pro Ser
        450   455   460

Val Asp Val Val Thr Gly Gly Lys Arg Phe Val Lys Val Asp Gly Asp
465   470   475   480

Val Thr Ser Asp Gln Thr Leu Ala Gly Ala Glu Phe Val Val Arg Asp
                485   490   495

Gln Asp Ser Asp Thr Ala Lys Tyr Leu Ser Ile Asp Pro Ser Thr Lys

Ala Val Ser Trp Val Ser Ala Lys Glu Ser Ala Thr Val Phe Thr Thr
    515   520   525

Thr Ser Asn Gly Leu Ile Asp Val Thr Gly Leu Lys Tyr Gly Thr Tyr
    530   535   540

Tyr Leu Glu Glu Thr Lys Ala Pro Glu Lys Tyr Val Pro Leu Thr Asn
545   550   555   560

Arg Val Ala Phe Thr Ile Asp Glu Gln Ser Tyr Val Thr Ala Gly Gln
              565   570   575

Leu Ile Ser Pro Glu Lys Ile Pro Asn Lys His Lys Gly Thr Leu Pro
              580   585   590

Ser Thr Gly Gly Lys Gly Ile Tyr Val Tyr Ile Gly Ala Gly Val Val
          595   600   605

Leu Leu Leu Ile Ala Gly Leu Tyr Phe Ala Arg Arg Lys His Ser Gln
    610   615   620

Ile
625

<210>   20
<211>   2402
<212>   PRT
<213>   Staphylococcus epidermidis

<400>   20

Met Lys Asn Lys Gln Gly Phe Leu Pro Asn Leu Leu Asn Lys Tyr Gly
1   5   10   15

Ile Arg Lys Leu Ser Ala Gly Thr Ala Ser Leu Leu Ile Gly Ala Thr
            20   25   30

Leu Val Phe Gly Ile Asn Gly Gln Val Lys Ala Ala Glu Thr Asp Asn
        35   40   45

Ile Val Ser Gln Asn Gly Asp Asn Lys Thr Asn Asp Ser Glu Ser Ser
    50   55   60

Asp Lys Glu Leu Val Lys Ser Glu Asp Asp Lys Thr Ser Ser Thr Ser
65   70   75   80

Thr Asp Thr Asn Leu Glu Ser Glu Phe Asp Gln Asn Asn Asn Pro Ser
                85   90   95

Ser Ile Glu Glu Ser Thr Asn Arg Asn Asp Glu Asp Thr Leu Asn Gln
            100   105   110

Arg Thr Ser Thr Glu Thr Glu Lys Asp Thr His Val Lys Ser Ala Asp
            115   120   125

Thr Gln Thr Thr Asn Glu Thr Thr Asn Lys Asn Asp Asp Asn Ala Thr
    130   135   140

Thr Asn His Thr Glu Ser Ile Ser Asp Glu Ser Thr Tyr Gln Ser Asp
145   150   155   160

Asp Ser Lys Thr Thr Gln His Asp Asn Ser Asn Thr Asn Gln Asp Thr
            165   170   175

Gln Ser Thr Leu Asn Pro Thr Ser Lys Glu Ser Ser Asn Lys Asp Glu
            180   185   190

Ala Thr Ser Pro Thr Pro Lys Glu Ser Thr Ser Ile Glu Lys Thr Asn
            195   200   205

Leu Ser Asn Asp Ala Asn His Gln Thr Thr Asp Glu Val Asn His Ser
    210   215   220

Asp Ser Asp Asn Met Thr Asn Ser Thr Pro Asn Asp Thr Glu Asn Glu
225   230   235   240

Leu Asp Thr Thr Gln Leu Thr Ser His Asp Glu Ser Pro Ser Pro Gln
                245   250   255

Ser Asp Asn Phe Thr Gly Phe Thr Asn Leu Met Ala Thr Pro Leu Asn
                260   265   270

Leu Arg Asn Asp Asn Pro Arg Ile Asn Leu Leu Ala Ala Thr Glu Asp
            275   280   285

Thr Lys Pro Lys Thr Tyr Lys Lys Pro Asn Asn Ser Glu Tyr Ser Tyr
    290   295   300

Leu Leu Asn Asp Leu Gly Tyr Asp Ala Thr Thr Val Lys Glu Asn Ser
305   310   315   320

Asp Leu Arg His Ala Gly Ile Ser Gln Ser Gln Asp Asn Thr Gly Ser
                325   330   335

Val Ile Lys Leu Asn Leu Thr Lys Trp Leu Ser Leu Gln Ser Asp Phe
                340   345   350

Val Asn Gly Gly Lys Val Asn Leu Ser Phe Ala Gln Ser Asp Phe Tyr
                355   360   365

Thr Gln Ile Glu Ser Ile Thr Leu Asn Asp Val Lys Met Asp Thr Thr
    370   375   380

Asn Asn Gly Gln Asn Trp Ser Ala Pro Ile Asn Gly Ser Thr Val Arg
385   390   395   400

Ser Gly Leu Ile Gly Ser Val Thr Asn His Asp Ile Val Ile Thr Leu
                405   410   415

Lys Asn Ser Gln Thr Leu Ser Ser Leu Gly Tyr Ser Asn Asn Lys Pro
                420   425   430

Val Tyr Leu Thr His Thr Trp Thr Thr Asn Asp Gly Ala Ile Ala Glu
                435   440   445

Glu Ser Ile Gln Val Ala Ser Ile Thr Pro Thr Leu Asp Ser Lys Ala
    450   455   460

Pro Asn Thr Ile Gln Lys Ser Asp Phe Thr Ala Gly Arg Met Thr Asn
465   470   475   480

Lys Ile Lys Tyr Asp Ser Ser Gln Asn Ser Ile Lys Ser Val His Thr
                485   490   495

Phe Lys Pro Asn Glu Asn Phe Leu Gln Thr Asp Tyr Arg Ala Val Leu
                500   505   510

Tyr Ile Lys Glu Gln Val Asn Lys Glu Leu Ile Pro Tyr Ile Asp Pro

515   520   525

Asn Ser Val Lys Leu Tyr Val Ser Asp Pro Asp Gly Asn Pro Ile Ser
    530   535   540

Gln Asp Arg Tyr Val Asn Gly Ser Ile Asp Asn Asp Gly Leu Phe Asp
545   550   555   560

Ser Ser Lys Ile Asn Glu Ile Ser Ile Lys Asn Asn Asn Thr Ser Gly
                 565   570   575

Gln Leu Ser Asn Ala Arg Thr Ser Leu Asp Arg Asn Val Phe Phe Gly
             580   585   590

Thr Leu Gly Gln Ser Arg Ser Tyr Thr Ile Ser Tyr Lys Leu Lys Asp
             595   600   605

Gly Tyr Thr Leu Glu Ser Val Ala Ser Lys Val Ser Ala Arg Glu Thr
    610   ·615   620

Phe Asp Ser Trp Met Glu Val Asp Tyr Leu Asp Ser Tyr Asp Ser Gly
625   630   635   640

Ala Pro Asn Lys Arg Leu Leu Gly Ser Tyr Ala Ser Ser Tyr Ile Asp
                 645   650   655

Met Ile Asp Arg Ile Pro Pro Val Ala Pro Lys Ala Asn Ser Ile Thr
             660   665   670

Thr Glu Asp Thr Ser Ile Lys Gly Thr Ala Glu Val Asp Thr Asn Ile
             675   680   685

Asn Leu Thr Phe Asn Asp Gly Arg Thr Leu Asn Gly Lys Val Asp Ser
    690   695   700

Asn Gly Asn Phe Ser Ile Ala Ile Pro Ser Tyr Tyr Val Leu Thr Gly
705   710   715   720

Lys Glu Thr Ile Lys Ile Thr Ser Ile Asp Lys Gly Asp Asn Val Ser
             725   730   735.

Pro Ala Ile Thr Ile Ser Val Ile Asp Lys Thr Pro Pro Ala Val Lys
             740   745   750

```
Ala Ile Ser Asn Lys Thr Gln Lys Val Asn Thr Glu Ile Glu Pro Ile
        755                 760                 765

Lys Ile Glu Ala Thr Asp Asn Ser Gly Gln Ala Val Thr Asn Lys Val
        770                 775                 780

Glu Gly Leu Pro Ala Gly Met Thr Phe Asp Glu Ala Thr Asn Thr Ile
785                 790                 795                 800

Ser Gly Thr Pro Ser Glu Val Gly Ser Tyr Asp Ile Thr Val Thr Thr
                805                 810                 815

Thr Asp Glu Asn Gly Asn Ser Glu Thr Thr Thr Phe Thr Ile Asp Val
        820                 825                 830

Glu Asp Thr Thr Lys Pro Thr Val Glu Ser Val Ala Asp Gln Thr Gln
        835                 840                 845

Glu Val Asn Thr Glu Ile Glu Pro Ile Lys Ile Glu Ala Thr Asp Asn
        850                 855                 860

Ser Gly Arg Ala Val Thr Asn Lys Val Asp Gly Leu Pro Asp Gly Val
865                 870                 875                 880

Thr Phe Asp Glu Ala Thr Asn Thr Ile Ser Gly Thr Pro Ser Glu Val
                885                 890                 895

Gly Ser Tyr Asp Ile Thr Val Thr Thr Thr Asp Glu Ser Gly Asn Val
                900                 905                 910

Thr Glu Thr Ile Phe Thr Ile Asp Val Glu Asp Thr Thr Lys Pro Thr
        915                 920                 925

Val Glu Ser Ile Ala Gly Gln Thr Gln Glu Val Asn Thr Glu Ile Glu
        930                 935                 940

Pro Ile Lys Ile Glu Ala Lys Asp Asn Ser Gly Gln Thr Val Thr Asn
945                 950                 955                 960

Lys Val Asp Gly Leu Pro Asp Gly Val Thr Phe Asp Glu Ala Thr Asn
                965                 970                 975
```

Thr Ile Ser Gly Thr Pro Ser Glu Val Gly Ser Tyr Asp Val Thr Val
          980   985   990

Thr Thr Thr Asp Glu Ser Gly Asn Ser Glu Thr Thr Thr Phe Thr Ile
         995   1000   1005

Glu Val Lys Asp Thr Thr Lys Pro Thr Val Glu Ser Val Ala Asp
    1010   1015   1020

Gln Thr Gln Glu Val Asn Thr Glu Ile Glu Pro Ile Lys Ile Glu
    1025   1030   1035

Ala Arg Asp Asn Ser Gly Gln Ala Val Thr Asn Lys Val Asp Gly
    1040   1045   1050

Leu Pro Asp Gly Val Thr Phe Asp Glu Ala Thr Asn Thr Ile Ser
    1055   1060   1065

Gly Thr Pro Ser Glu Val Gly Ser Tyr Asp Ile Thr Val Thr Thr
    1070   1075   1080

Thr Asp Glu Ser Gly Asn Val Thr Glu Thr Thr Phe Thr Ile Glu
    1085   1090   1095

Val Glu Asp Thr Thr Lys Pro Thr Val Glu Asn Val Ala Asp Gln
    1100   1105   1110

Thr Gln Glu Val Asn Thr Glu Ile Thr Pro Ile Thr Ile Glu Ser
    1115   1120   1125

Glu Asp Asn Ser Gly Gln Thr Val Thr Asn Lys Val Asp Gly Leu
    1130   1135   1140

Pro Asp Gly Val Thr Phe Asp Glu Thr Thr Asn Thr Ile Ser Gly
    1145   1150   1155

Thr Pro Ser Lys Val Gly Ser Tyr Asp Ile Thr Val Thr Thr Thr
    1160   1165   1170

Asp Glu Ser Gly Asn Ala Thr Glu Thr Thr Phe Thr Ile Glu Val
    1175   1180   1185

Glu Asp Thr Thr Lys Pro Thr Val Glu Asn Val Ala Gly Gln Thr
    1190   1195   1200

Gln Glu Ile Asn Thr Glu Ile Glu Pro Ile Lys Ile Glu Ala Thr
    1205   1210   1215

Asp Asn Ser Gly Gln Ala Val Thr Asn Lys Val Glu Gly Leu Pro
    1220   1225   1230

Ala Gly Val Thr Phe Asp Glu Ala Thr Asn Thr Ile Ser Gly Thr
    1235   1240   1245

Pro Ser Glu Val Gly Ser Tyr Thr Val Thr Val Thr Thr Met Asp
    1250   1255   1260

Glu Ser Gly Asn Ala Thr Glu Thr Thr Phe Thr Ile Asp Val Glu
    1265   1270   1275

Asp Thr Thr Lys Pro Thr Val Glu Ser Val Ala Asp Gln Thr Gln
    1280   1285   1290

Glu Val Asn Thr Glu Ile Thr Pro Ile Thr Ile Glu Ser Glu Asp
    1295   1300   1305

Asn Ser Asp Gln Ala Val Thr Asn Lys Val Asp Gly Leu Pro Asp
    1310   1315   1320

Gly Val Thr Phe Asp Glu Ala Thr Asn Thr Ile Ser Gly Thr Pro
    1325   1330   1335

Ser Glu Val Gly Ser Tyr Thr Val Thr Val Thr Thr Thr Asp Glu
    1340   1345   1350

Ser Gly Asn Ala Thr Glu Thr Thr Phe Thr Ile Asp Val Glu Asp
    1355   1360   1365

Thr Thr Lys Pro Thr Val Lys Ser Val Ser Asp Gln Thr Gln Glu
    1370   1375   1380

Val Asn Thr Glu Ile Thr Pro Ile Lys Ile Glu Ala Thr Asp Asn
    1385   1390   1395

Ser Gly Gln Thr Val Thr Asn Lys Val Asp Gly Leu Pro Asp Gly

```
         1400                      1405                        1410


Ile Thr  Phe Asp Glu Ala Thr  Asn Thr Ile Ser Gly  Thr Pro Ser
    1415                 1420                 1425


Glu Val  Gly Ser Tyr Asp Ile  Thr Val Thr Thr Thr  Asp Glu Ser
    1430                 1435                 1440


Gly Asn  Ala Thr Glu Thr Thr  Phe Thr Ile Asn Val  Glu Asp Thr
    1445                 1450                 1455


Thr Lys  Pro Thr Val Glu Asp  Ile Ala Asp Gln Thr  Gln Glu Val
    1460                 1465                 1470


Asn Thr  Glu Ile Glu Pro Ile  Lys Ile Glu Ala Thr  Asp Asn Gly
    1475                 1480                 1485


Gly Gln  Ala Val Thr Asn Lys  Val Asp Gly Leu Pro  Asp Gly Val
    1490                 1495                 1500


Thr Phe  Asp Glu Ala Thr Asn  Thr Ile Ser Gly Thr  Pro Ser Glu
    1505                 1510                 1515


Val Gly  Ser Tyr Asp Ile Ile  Val Thr Thr Thr Asp  Glu Asn Gly
    1520                 1525                 1530


Asn Ser  Glu Thr Thr Thr Phe  Thr Ile Asp Val Glu  Asp Thr Thr
    1535                 1540                 1545


Lys Pro  Thr Val Glu Ser Val  Val Asp Gln Thr Gln  Glu Val Asn
    1550                 1555                 1560


Thr Glu  Ile Thr Pro Ile Lys  Ile Glu Ala Thr Asp  Asn Ser Gly
    1565                 1570                 1575


Gln Ala  Val Ala Asn Lys Val  Asp Gly Leu Pro Asn  Gly Val Thr
    1580                 1585                 1590


Phe Asp  Glu Thr Thr Asn Thr  Ile Ser Gly Thr Pro  Ser Glu Val
    1595                 1600                 1605


Gly Ser  Tyr Asp Ile Ile Val  Thr Thr Thr Asp Glu  Ser Gly Asn
    1610                 1615                 1620
```

```
Val Thr  Glu Thr Ile Phe Thr  Ile Asp Val Glu Asp  Thr Thr Lys
    1625              1630              1635

Pro Thr  Val Glu Ser Ile Ala  Gly Gln Thr Gln Glu  Val Asn Thr
    1640              1645              1650

Glu Ile  Glu Pro Ile Lys Ile  Glu Ala Thr Asp Asn  Ser Gly Gln
    1655              1660              1665

Ala Val  Thr Asn Lys Val Asp  Gly Leu Pro Asn Gly  Val Thr Phe
    1670              1675              1680

Asp Glu  Ala Thr Asn Thr Ile  Ser Gly Thr Pro Ser  Glu Val Gly
    1685              1690              1695

Ile Tyr  Thr Val Thr Val Thr  Thr Thr Asp Glu Ser  Gly Asn Ala
    1700              1705              1710

Thr Glu  Thr Thr Phe Thr Ile  Asp Val Glu Asp Thr  Thr Lys Pro
    1715              1720              1725

Thr Val  Glu Ser Val Ala Asp  Gln Thr Gln Glu Val  Asn Thr Glu
    1730              1735              1740

Ile Thr  Pro Ile Thr Ile Glu  Ser Glu Asp Asn Ser  Gly Gln Ala
    1745              1750              1755

Val Thr  Asn Lys Val Glu Gly  Leu Pro Ala Gly Met  Thr Phe Asp
    1760              1765              1770

Glu Thr  Thr Asn Thr Ile Ser  Gly Thr Pro Ser Glu  Val Gly Ser
    1775              1780              1785

Tyr Thr  Val Thr Val Thr Thr  Thr Asp Glu Ser Gly  Asn Glu Thr
    1790              1795              1800

Glu Thr  Thr Phe Thr Ile Asp  Val Glu Asp Thr Thr  Lys Pro Thr
    1805              1810              1815

Val Glu  Ser Ile Ala Asn Gln  Thr Gln Glu Val Asn  Thr Glu Ile
    1820              1825              1830
```

```
Thr Pro  Ile Lys Ile Glu Ala  Thr Asp Asn Ser Gly  Gln Ala Val
    1835                 1840                 1845

Thr Asn  Lys Val Asp Gly Leu  Pro Asn Gly Val Thr  Phe Asp Glu
    1850                 1855                 1860

Thr Thr  Asn Thr Ile Ser Gly  Thr Pro Ser Glu Val  Gly Ser Tyr
    1865                 1870                 1875

Asp Ile  Lys Val Thr Thr Thr  Asp Glu Ser Gly Asn  Ala Thr Glu
    1880                 1885                 1890

Thr Thr  Phe Thr Ile Asn Val  Glu Asp Thr Thr Lys  Pro Thr Val
    1895                 1900                 1905

Glu Ser  Val Ala Asp Gln Thr  Gln Glu Ile Asn Thr  Glu Ile Glu
    1910                 1915                 1920

Pro Ile  Lys Ile Glu Ala Arg  Asp Asn Ser Gly Gln  Ala Val Thr
    1925                 1930                 1935

Asn Lys  Val Asp Gly Leu Pro  Asp Gly Val Thr Phe  Asp Glu Ala
    1940                 1945                 1950

Thr Asn  Thr Ile Ser Gly Thr  Pro Ser Glu Val Gly  Ser Tyr Asp
    1955                 1960                 1965

Ile Thr  Val Thr Thr Thr Asp  Glu Ser Gly Asn Ala  Thr Glu Thr
    1970                 1975                 1980

Thr Phe  Thr Ile Asp Val Glu  Asp Thr Thr Lys Pro  Thr Val Glu
    1985                 1990                 1995

Asp Ile  Thr Asp Gln Thr Gln  Glu Ile Asn Thr Glu  Met Thr Pro
    2000                 2005                 2010

Ile Lys  Ile Glu Ala Thr Asp  Asn Ser Gly Gln Ala  Val Thr Asn
    2015                 2020                 2025

Lys Val  Glu Gly Leu Pro Asp  Gly Val Thr Phe Asp  Glu Ala Thr
    2030                 2035                 2040
```

Asn Thr Ile Ser Gly Thr Pro Ser Glu Val Gly Lys Tyr Leu Ile
    2045   2050   2055

Thr Ile Thr Thr Ile Asp Lys Asp Gly Asn Thr Ala Thr Thr Thr
    2060   2065   2070

Leu Thr Ile Asn Val Ile Asp Thr Thr Thr Pro Glu Gln Pro Thr
    2075   2080   2085

Ile Asn Lys Val Thr Glu Asn Ser Thr Glu Val Asn Gly Arg Gly
    2090   2095   2100

Glu Pro Gly Thr Val Val Glu Val Thr Phe Pro Asp Gly Asn Lys
    2105   2110   2115

Val Glu Gly Lys Val Asp Ser Asp Gly Asn Tyr His Ile Gln Ile
    2120   2125   2130

Pro Ser Glu Thr Thr Leu Lys Gly Gly Gln Pro Leu Gln Val Ile
    2135   2140   2145

Ala Ile Asp Lys Ala Gly Asn Lys Ser Glu Ala Thr Thr Thr Asn
    2150   2155   2160

Val Ile Asp Thr Thr Ala Pro Glu Gln Pro Thr Ile Asn Lys Val
    2165   2170   2175

Thr Glu Asn Ser Thr Glu Val Ser Gly Arg Gly Glu Pro Gly Thr
    2180   2185   2190

Val Val Glu Val Thr Phe Pro Asp Gly Asn Lys Val Glu Gly Lys
    2195   2200   2205

Val Asp Ser Asp Gly Asn Tyr His Ile Gln Ile Pro Ser Asp Glu
    2210   2215   2220

Arg Phe Lys Val Gly Gln Gln Leu Ile Val Lys Val Val Asp Glu
    2225   2230   2235

Glu Gly Asn Val Ser Glu Pro Ser Ile Thr Met Val Gln Lys Glu
    2240   2245   2250

Asp Lys Asn Ser Glu Lys Leu Ser Thr Val Thr Gly Thr Val Thr

Lys Asn Asn Ser Lys Ser Leu Lys His Lys Ala Ser Glu Gln Gln
    2270   2275   2280

Ser Tyr His Asn Lys Ser Glu Lys Ile Lys Asn Val Asn Lys Pro
    2285   2290   2295

Thr Lys Ile Val Glu Lys Asp Met Ser Thr Tyr Asp Tyr Ser Arg
    2300   2305   2310

Tyr Ser Lys Asp Ile Ser Asn Lys Asn Asn Lys Ser Ala Thr Phe
    2315   2320   2325

Glu Gln Gln Asn Val Ser Asp Ile Asn Asn Asn Gln Tyr Ser Arg
    2330   2335   2340

Asn Lys Val Asn Gln Pro Val Lys Lys Ser Arg Lys Asn Glu Ile
    2345   2350   2355

Asn Lys Asp Leu Pro Gln Thr Gly Glu Glu Asn Phe Asn Lys Ser
    2360   2365   2370

Thr Leu Phe Gly Thr Leu Val Ala Ser Leu Gly Ala Leu Leu Leu
    2375   .   2380   2385

Phe Phe Lys Arg Arg Lys Lys Asp Glu Asn Asp Glu Lys Glu
    2390   2395   2400

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<212> PRT
<213> Staphylococcus epidermidis

<400> 21

Leu Phe Gly Leu Gly His Asn Glu Ala Lys Ala Glu Glu Asn Thr Val
1   5   10   15

Gln Asp Val Lys Asp Ser Asn Met Asp Asp Glu Leu Ser Asp Ser Asn
            20   25   30

Asp Gln Ser Ser Asn Glu Glu Lys Asn Asp Val Ile Asn Asn Ser Gln
        35   40   45

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Ser Ile Asn Thr Asp Asp Asp Asn Gln Ile Lys Lys Glu Glu Thr Asn
    50              55                  60

Ser Asn Asp Ala Ile Glu Asn Arg Ser Lys Asp Ile Thr Gln Ser Thr
65              70                  75                  80

Thr Asn Val Asp Glu Asn Glu Ala Thr Phe Leu Gln Lys Thr Pro Gln
                85                  90                  95

Asp Asn Thr Gln Leu Lys Glu Glu Val Val Lys Glu Pro Ser Ser Val
            100             105                 110

Glu Ser Ser Asn Ser Ser Met Asp Thr Ala Gln Gln Pro Ser His Thr
        115                 120                 125

Thr Ile Asn Ser Glu Ala Ser Ile Gln Thr Ser Asp Asn Glu Glu Asn
    130             135                 140

Ser Arg Val Ser Asp Phe Ala Asn Ser Lys Ile Ile Glu Ser Asn Thr
145             150                 155                 160

Glu Ser Asn Lys Glu Glu Asn Thr Ile Glu Gln Pro Asn Lys Val Arg
            165                 170                 175

Glu Asp Ser Ile Thr Ser Gln Pro Ser Ser Tyr Lys Asn Ile Asp Glu
            180             185                 190

Lys Ile Ser Asn Gln Asp Glu Leu Leu Asn Leu Pro Ile Asn Glu Tyr
        195             200             205

Glu Asn Lys Val Arg Pro Leu Ser Thr Thr Ser Ala Gln Pro Ser Ser
    210             215                 220

Lys Arg Val Thr Val Asn Gln Leu Ala Ala Glu Gln Gly Ser Asn Val
225             230             235                 240

Asn His Leu Ile Lys Val Thr Asp Gln Ser Ile Thr Glu Gly Tyr Asp
            245             250                 255

Asp Ser Asp Gly Ile Ile Lys Ala His Asp Ala Glu Asn Leu Ile Tyr
            260             265                 270
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Asp Val Thr Phe Glu Val Asp Asp Lys Val Lys Ser Gly Asp Thr Met
        275                     280                 285

Thr Val Asn Ile Asp Lys Asn Thr Val Pro Ser Asp Leu Thr Asp Ser
        290                     295                 300

Phe Ala Ile Pro Lys Ile Lys Asp Asn Ser Gly Glu Ile Ile Ala Thr
305                     310                 315                 320

Gly Thr Tyr Asp Asn Thr Asn Lys Gln Ile Thr Tyr Thr Phe Thr Asp
                325                     330                 335

Tyr Val Asp Lys Tyr Glu Asn Ile Lys Ala His Leu Lys Leu Thr Ser
            340                     345                 350

Tyr Ile Asp Lys Ser Lys Val Pro Asn Asn Asn Thr Lys Leu Asp Val
        355                     360                 365

Glu Tyr Lys Thr Ala Leu Ser Ser Val Asn Lys Thr Ile Thr Val Glu
    370                     375                 380

Tyr Gln Lys Pro Asn Glu Asn Arg Thr Ala Asn Leu Gln Ser Met Phe
385                     390                 395                 400

Thr Asn Ile Asp Thr Lys Asn His Thr Val Glu Gln Thr Ile Tyr Ile
                405                     410                 415

Asn Pro Leu Arg Tyr Ser Ala Lys Glu Thr Asn Val Asn Ile Ser Gly
            420                     425                 430

Asn Gly Asp Glu Gly Ser Thr Ile Ile Asp Asp Ser Thr Ile Ile Lys
        435                     440                 445

Val Tyr Lys Val Gly Asp Asn Gln Asn Leu Pro Asp Ser Asn Arg Ile
    450                     455                 460

Tyr Asp Tyr Ser Glu Tyr Glu Asp Val Thr Asn Asp Asp Tyr Ala Gln
465                     470                 475                 480

Leu Gly Asn Asn Asn Asp Val Asn Ile Asn Phe Gly Asn Ile Asp Ser
                485                     490                 495

Pro Tyr Ile Ile Lys Val Ile Ser Lys Tyr Asp Pro Asn Lys Asp Asp
```

                500   505   510

Tyr Thr Thr Ile Gln Gln Thr Val Thr Met Gln Thr Thr Ile Asn Glu
        515   520   525

Tyr Thr Gly Glu Phe Arg Thr Ala Ser Tyr Asp Asn Thr Ile Ala Phe
        530   535   540

Ser Thr Ser Ser Gly Gln Gly Gln Gly Asp Leu Pro Pro Glu Lys Thr
545   550   555   560

Tyr Lys Ile Gly Asp Tyr Val Trp Glu Asp Val Asp Lys Asp Gly Ile
                565   570   575

Gln Asn Thr Asn Asp Asn Glu Lys Pro Leu Ser Asn Val Leu Val Thr
            580   585   590

Leu Thr Tyr Pro Asp Gly Thr Ser Lys Ser Val Arg Thr Asp Glu Glu
        595   600   605

Gly Lys Tyr Gln Phe Asp Gly Leu Lys Asn Gly Leu Thr Tyr Lys Ile
        610   615   620

Thr Phe Glu Thr Pro Glu Gly Tyr Thr Pro Thr Leu Lys His Ser Gly
625   630   635   640

Thr Asn Pro Ala Leu Asp Ser Glu Gly Asn Ser Val Trp Val Thr Ile
            645   650   655

Asn Gly Gln Asp Asp Met Thr Ile Asp Ser Gly Phe Tyr Gln Thr Pro
            660   665   670

Lys Tyr Ser Leu Gly Asn Tyr Val Trp Tyr Asp Thr Asn Lys Asp Gly
        675   680   685

Ile Gln Gly Asp Asp Glu Lys Gly Ile Ser Gly Val Lys Val Thr Leu
        690   695   700

Lys Asp Glu Asn Gly Asn Ile Ile Ser Thr Thr Thr Thr Asp Glu Asn
705   710   715   720

Gly Lys Tyr Gln Phe Asp Asn Leu Asn Ser Gly Asn Tyr Ile Val His
            725   730   735

Phe Asp Lys Pro Ser Gly Met Thr Gln Thr Thr Thr Asp Ser Gly Asp
        740   745   750

Asp Asp Glu Gln Asp Ala Asp Gly Glu Glu Val His Val Thr Ile Thr
        755   760   765

Asp His Asp Asp Phe Ser Ile Asp Asn Gly Tyr Tyr Asp Asp Asp Ser
        770   775   780

Asp Ser Asp Ser Asp Ser Asp Ser Asp Ser Asp Asp Ser Asp Ser Asp
785   790   795   800

Ser Asp Ser Asp Ser Asp Ser Asp Ser Asp Ser Asp Ser Asp Ser Asp
                805   810   815

Ser Asp Ser Asp Ser Asp Ser Asp Ser Asp Ser Asp Ser Asp Ser Asp
                820   825   830

Ser Asp Ser Asp Ser Asp Ser Gly Leu Asp Asn Ser Ser Asp Lys Asn
                835   840   845

Thr Lys Asp Lys Leu Pro Asp Thr Gly Ala Asn Glu Asp His Asp Ser
        850   855   860

Lys Gly Thr Leu Leu Gly Ala Leu Phe Ala Gly Leu Gly Ala Leu Leu
865   870   875   880

Leu Gly Lys Arg Arg Lys Asn Arg Lys Asn Lys Asn
                885   890

<210> 22
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<213> Staphylococcus epidermidis

<400> 22

Met Lys Glu Asn Lys Arg Lys Asn Asn Leu Asp Lys Asn Asn Thr Arg
1   5   10   15

Phe Ser Ile Arg Lys Tyr Gln Gly Tyr Gly Ala Thr Ser Val Ala Ile
            20   25   30

```
Ile Gly Phe Ile Ile Ile Ser Cys Phe Ser Glu Ala Lys Ala Asp Ser
        35                  40              45

Asp Lys His Glu Ile Lys Ser His Gln Gln Ser Met Thr Asn His Leu
        50              55              60

Thr Thr Leu Pro Ser Asp Asn Gln Glu Asn Thr Ser Asn Asn Glu Phe
65              70              75              80

Asn Asn Arg Asn His Asp Ile Ser His Leu Ser Leu Asn Lys Ser Ile
                85              90              95

Gln Met Asp Glu Leu Lys Lys Leu Ile Lys Gln Tyr Lys Ala Ile Asn
            100             105             110

Leu Asn Asp Lys Thr Glu Glu Ser Ile Lys Leu Phe Gln Ser Asp Leu
            115             120             125

Val Gln Ala Glu Ser Leu Ile Asn Asn Pro Gln Ser Gln Gln His Val
    130             135             140

Asp Ala Phe Tyr His Lys Phe Leu Asn Ser Ala Gly Lys Leu Arg Lys
145             150             155             160

Lys Glu Thr Val Ser Ile Lys His Glu Arg Ser Glu Ser Asn Thr Tyr
            165             170             175

Arg Leu Gly Asp Glu Val Arg Ser Gln Thr Phe Ser His Ile Arg His
            180             185             190

Lys Arg Asn Ala Val Ser Phe Arg Asn Ala Asp Gln Ser Asn Leu Ser
        195             200             205

Thr Asp Pro Leu Lys Ala Asn Glu Ile Asn Pro Glu Ile Gln Asn Gly
    210             215             220

Asn Phe Ser Gln Val Ser Gly Gly Pro Leu Pro Thr Ser Ser Lys Arg
225             230             235             240

Leu Thr Val Val Thr Asn Val Asp Asn Trp His Ser Tyr Ser Thr Asp
            245             250             255

Pro Asn Pro Glu Tyr Pro Met Phe Tyr Thr Thr Thr Ala Val Asn Tyr
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          260                    265                    270

Pro Asn Phe Met Ser Asn Gly Asn Ala Pro Tyr Gly Val Ile Leu Gly
        275                    280                    285

Arg Thr Thr Asp Gly Trp Asn Arg Asn Val Ile Asp Ser Lys Val Ala
        290                    295                    300

Gly Ile Tyr Gln Asp Ile Asp Val Val Pro Gly Ser Glu Leu Asn Val
305                    310                    315                    320

Asn Phe Ile Ser Thr Ser Pro Val Phe Ser Asp Gly Ala Ala Gly Ala
                  325                    330                    335

Lys Leu Lys Ile Ser Asn Val Glu Gln Asn Arg Val Leu Phe Asp Ser
              340                    345                    350

Arg Leu Asn Gly Met Gly Pro Tyr Pro Thr Gly Lys Leu Ser Ala Met
        355                    360                    365

Val Asn Ile Pro Asn Asp Ile Asn Arg Val Arg Ile Ser Phe Leu Pro
        370                    375                    380

Val Ser Ser Thr Gly Arg Val Ser Val Gln Arg Ser Ser Arg Glu His
385                    390                    395                    400

Gly Phe Gly Asp Asn Ser Ser Tyr Tyr His Gly Gly Ser Val Ser Asp
                  405                    410                    415

Val Arg Ile Asn Ser Gly Ser Tyr Val Val Ser Lys Val Thr Gln Arg
                  420                    425                    430

Glu Tyr Thr Thr Arg Pro Asn Ser Ser Asn Asp Thr Phe Ala Arg Ala
        435                    440                    445

Thr Ile Asn Leu Ser Val Glu Asn Lys Gly His Asn Gln Ser Lys Asp
        450                    455                    460

Thr Tyr Tyr Glu Val Ile Leu Pro Gln Asn Ser Arg Leu Ile Ser Thr
465                    470                    475                    480

Arg Gly Gly Ser Gly Asn Tyr Asn Asn Ala Thr Asn Lys Leu Ser Ile
                  485                    490                    495
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Arg Leu Asp Asn Leu Asn Pro Gly Asp Arg Arg Asp Ile Ser Tyr Thr
        500                 505                 510

Val Asp Phe Glu Ser Ser Ser Pro Lys Leu Ile Asn Leu Asn Ala His
        515                 520                 525

Leu Leu Tyr Lys Thr Asn Ala Thr Phe Arg Gly Asn Asp Gly Gln Arg
    530                 535                 540

Thr Gly Asp Asn Ile Val Asp Leu Gln Ser Ile Ala Leu Leu Met Asn
545                 550                 555                 560

Lys Asp Val Leu Glu Thr Glu Leu Asn Glu Ile Asp Lys Phe Ile Arg
            565                 570                 575

Asp Leu Asn Glu Ala Asp Phe Thr Ile Asp Ser Trp Ser Ala Leu Gln
        580                 585                 590

Glu Lys Met Thr Glu Gly Gly Asn Ile Leu Asn Glu Gln Gln Asn Gln
    595                 600                 605

Val Ala Leu Glu Asn Gln Ala Ser Gln Glu Thr Ile Asn Asn Val Thr
    610                 615                 620

Gln Ser Leu Glu Ile Leu Lys Asn Asn Leu Lys Tyr Lys Thr Pro Ser
625                 630                 635                 640

Gln Pro Ile Ile Lys Ser Asn Asn Gln Ile Pro Asn Ile Thr Ile Ser
            645                 650                 655

Pro Ala Asp Lys Ala Asp Lys Leu Thr Ile Thr Tyr Gln Asn Thr Asp
            660                 665                 670

Asn Glu Ser Ala Ser Ile Ile Gly Asn Lys Leu Asn Asn Gln Trp Ser
        675                 680                 685

Leu Asn Asn Asn Ile Pro Gly Ile Glu Ile Asp Met Gln Thr Gly Leu
    690                 695                 700

Val Thr Ile Asp Tyr Lys Ala Val Tyr Pro Glu Ser Val Val Gly Ala
705                 710                 715                 720
```

Asn Asp Lys Thr Gly Asn Ser Asp Ala Ser Ala Glu Ser Arg Ile Thr
            725   730   735

Met Pro Arg Lys Glu Ala Thr Pro Leu Ser Pro Ile Val Glu Ala Asn
            740   745   750

Glu Glu Arg Val Asn Val Val Ile Ala Pro Asn Gly Glu Ala Thr Gln
            755   760   765

Ile Ala Ile Lys Tyr Arg Thr Pro Asp Gly Gln Glu Ala Thr Leu Val
    770   775   780

Ala Ser Lys Asn Gly Ser Ser Trp Thr Leu Asn Lys Gln Ile Asp Tyr
785   790   795   800

Val Asn Ile Glu Glu Asn Ser Gly Lys Val Thr Ile Gly Tyr Gln Ala
            805   810   815

Val Gln Pro Glu Ser Glu Val Ile Ala Thr Glu Thr Lys Gly Asn Ser
            820   825   830

Asp Glu Ser Ala Glu Ser Arg Val Thr Met Pro Arg Lys Glu Ala Thr
            835   840   845

Pro His Ser Pro Ile Val Glu Ala Asn Glu Glu His Val Asn Val Thr
    850   855   860

Ile Ala Pro Asn Gly Glu Ala Thr Gln Ile Ala Ile Lys Tyr Arg Thr
865   870   875   880

Pro Asp Gly Gln Glu Thr Thr Leu Ile Ala Ser Lys Asn Gly Ser Ser
            885   .   890   895

Trp Thr Leu Asn Lys Gln Ile Asp Tyr Val Asn Ile Glu Glu Asn Ser
            900   905   910

Gly Lys Val Thr Ile Gly Tyr Gln Ala Val Gln Leu Glu Ser Glu Val
            915   920   925

Ile Ala Thr Glu Thr Lys Gly Asn Ser Asp Ala Ser Ala Glu Ser Arg
    930   935   940

Ile Thr Met Leu Arg Lys Glu Ala Thr Pro His Ser Pro Ile Val Glu
945   950   955   960

Ala Asn Glu Glu His Val Asn Val Thr Ile Ala Pro Asn Gly Glu Ala
                965   970   975

Thr Gln Ile Ala Ile Lys Tyr Arg Thr Pro Asp Gly Gln Glu Ala Thr
           980   985   990

Leu Val Ala Ser Lys Asn Glu Ser Ser Trp Thr Leu Asn Lys Gln Ile
         995   1000   1005

Asp His Val Asn Ile Asp Glu Asn Ser Gly Lys Val Thr Ile Gly
     1010   1015   1020

Tyr Gln Ala Val Gln Pro Glu Ser Glu Ile Ile Ala Thr Glu Thr
     1025   1030   1035

Lys Gly Asn Ser Asp Ala Ser Ala Glu Ser Arg Ile Thr Met Pro
     1040   1045   1050

Arg Lys Glu Ala Thr Pro Ile Pro Pro Thr Leu Glu Ala Ser Val
     1055   1060   1065

Gln Glu Ala Ser Val Thr Val Thr Pro Asn Glu Asn Ala Thr Lys
     1070   1075   1080

Val Phe Ile Lys Tyr Leu Asp Ile Asn Asp Glu Ile Ser Thr Ile
     1085   1090   1095

Ile Ala Ser Lys Ile Asn Gln Gln Trp Thr Leu Asn Lys Asp Asn
     1100   1105   1110

Phe Gly Ile Lys Ile Asn Pro Leu Thr Gly Lys Val Ile Ile Ser
     1115   1120   1125

Tyr Val Ala Val Gln Pro Glu Ser Asp Val Ile Ala Ile Glu Ser
     1130   1135   1140

Gln Gly Asn Ser Asp Leu Ser Glu Glu Ser Arg Ile Ile Met Pro
     1145   1150   1155

Thr Lys Glu Glu Pro Pro Glu Pro Pro Ile Leu Glu Ser Asp Ser

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            1160              1165                1170


Ile Glu  Ala Lys Val Asn Ile  Phe Pro Asn Asp Glu  Ala Thr Arg
    1175              1180              1185


Ile Val  Ile Met Tyr Thr Ser  Leu Glu Gly Gln Glu  Ala Thr Leu
    1190              1195              1200


Val Ala  Ser Lys Asn Glu Ser  Ser Trp Thr Leu Asn  Lys Gln Ile
    1205              1210              1215


Asp His  Val Asn Ile Asp Glu  Asn Ser Gly Lys Val  Thr Ile Gly
    1220              1225              1230


Tyr Gln  Ala Val Gln Pro Glu  Ser Glu Val Ile Ala  Thr Glu Thr
    1235              1240              1245


Lys Gly  Asn Ser Asp Ala Ser  Ala Glu Ser Arg Val  Thr Met Pro
    1250              1255              1260


Arg Lys  Glu Ala Thr Pro His  Ser Pro Ile Val Glu  Thr Asn Glu
    1265              1270              1275


Glu Arg  Val Asn Val Val Ile  Ala Pro Asn Gly Glu  Ala Thr Gln
    1280              1285              1290


Ile Ala  Ile Lys Tyr Arg Thr  Pro Asp Gly Gln Glu  Thr Thr Leu
    1295              1300              1305


Ile Ala  Ser Lys Asn Gly Ser  Ser Trp Thr Leu Asn  Lys Gln Ile
    1310              1315              1320


Asp His  Val Asn Ile Asp Glu  Asn Ser Gly Lys Val  Thr Ile Gly
    1325              1330              1335


Tyr Gln  Ala Val Gln Pro Glu  Ser Glu Ile Ile Ala  Thr Glu Thr
    1340              1345              1350


Lys Gly  Asn Ser Asp Ala Ser  Ala Glu Ser Arg Ile  Thr Met Pro
    1355              1360              1365


Arg Lys  Glu Ala Ile Pro His  Ser Pro Ile Val Glu  Ala Asn Glu
    1370              1375              1380
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```
Glu His  Val Asn Val Thr Ile  Ala Pro Asn Gly Glu  Thr Thr Gln
    1385             1390              1395

Ile Ala  Val Lys Tyr Arg Thr  Pro Asp Gly Gln Glu  Ala Thr Leu
    1400             1405              1410

Ile Ala  Ser Lys Asn Glu Ser  Ser Trp Thr Leu Asn  Lys Gln Ile
    1415             1420              1425

Asp His  Val Asn Ile Asp Glu  Asn Ser Gly Lys Val  Thr Ile Gly
    1430             1435              1440

Tyr Gln  Ala Val Gln Pro Glu  Ser Glu Val Ile Ala  Thr Glu Thr
    1445             1450              1455

Lys Gly  Asn Ser Asp Ala Ser  Ala Glu Ser Arg Ile  Thr Met Pro
    1460             1465              1470

Val Lys  Glu Lys Thr Pro Ala  Pro Pro Ile Ser Ile  Ile Asn Glu
    1475             1480              1485

Ser Asn  Ala Ser Val Glu Ile  Ile Pro Gln Val Asn  Val Thr Gln
    1490             1495              1500

Leu Ser  Leu Gln Tyr Ile Asp  Ala Lys Gly Gln Gln  Gln Asn Leu
    1505             1510              1515

Ile Ala  Thr Leu Asn Gln Asn  Gln Trp Thr Leu Asn  Lys Asn Val
    1520             1525              1530

Ser His  Ile Thr Val Asp Lys  Asn Thr Gly Lys Val  Leu Ile Asn
    1535             1540              1545

Tyr Gln  Ala Val Tyr Pro Glu  Ser Glu Val Ile Ala  Arg Glu Ser
    1550             1555              1560

Lys Gly  Asn Ser Asp Ser Ser  Asn Val Ser Met Val  Ile Met Pro
    1565             1570              1575

Arg Lys  Thr Ala Thr Pro Lys  Pro Pro Ile Ile Lys  Val Asp Glu
    1580             1585              1590
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Met Asn  Ala Ser Leu Ala Ile  Ile Pro Tyr Lys Asn  Asn Thr Ala
    1595                 1600             1605

Ile Asn  Ile His Tyr Ile Asp  Lys Lys Gly Ile Lys  Ser Met Val
    1610                 1615             1620

Thr Ala  Ile Lys Asn Asn Asp  Gln Trp Gln Leu Asp  Glu Lys Ile
    1625                 1630             1635

Lys Tyr  Val Lys Ile Asp Ala  Lys Thr Gly Thr Val  Ile Ile Asn
    1640                 1645             1650

Tyr Gln  Ile Val Gln Glu Asn  Ser Glu Ile Ile Ala  Thr Ala Ile
    1655                 1660             1665

Asn Gly  Asn Ser Asp Lys Ser  Glu Glu Val Lys Val  Leu Met Pro
    1670                 1675             1680

Ile Lys  Glu Phe Thr Pro Leu  Ala Pro Leu Leu Glu  Thr Asn Tyr
    1685                 1690             1695

Lys Lys  Ala Thr Val Ser Ile  Leu Pro Gln Ser Asn  Ala Thr Lys
    1700                 1705             1710

Leu Asp  Phe Lys Tyr Arg Asp  Lys Lys Gly Asp Ser  Lys Ile Ile
    1715                 1720             1725

Ile Val  Lys Arg Phe Lys Asn  Ile Trp Lys Ala Asn  Glu Gln Ile
    1730                 1735             1740

Ser Gly  Val Thr Ile Asn Pro  Glu Phe Gly Gln Val  Val Ile Asn
    1745                 1750             1755

Tyr Gln  Ala Val Tyr Pro Glu  Ser Asp Ile Leu Ala  Ala Gln Tyr
    1760                 1765             1770

Val Gly  Asn Ser Asp Ala Ser  Glu Trp Ala Lys Val  Lys Met Pro
    1775                 1780             1785

Lys Lys  Glu Leu Ala Pro His  Ser Pro Ser Leu Ile  Tyr Asp Asn
    1790                 1795             1800
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```
Arg Asn  Asn Lys Ile Leu Ile  Ala Pro Asn Ser Asn  Ala Thr Glu
    1805                1810                1815

Met Glu  Leu Ser Tyr Val Asp  Lys Asn Asn Gln Ser  Leu Lys Val
    1820                1825                1830

Lys Ala  Leu Lys Ile Asn Asn  Arg Trp Lys Phe Asp  Ser Ser Val
    1835                1840                1845

Ser Asn  Ile Ser Ile Asn Pro  Asn Thr Gly Lys Ile  Val Leu Gln
    1850                1855                1860

Pro Gln  Phe Leu Leu Thr Asn  Ser Lys Ile Ile Val  Phe Ala Lys
    1865                1870                1875

Lys Gly  Asn Ser Asp Ala Ser  Ile Ser Val Ser Leu  Arg Val Pro
    1880                1885                1890

Ala Val  Lys Lys Ile Glu Leu  Glu Pro Met Phe Asn  Val Pro Val
    1895                1900                1905

Leu Val  Ser Leu Asn Lys Lys  Arg Ile Gln Phe Asp  Asp Cys Ser
    1910                1915                1920

Gly Val  Lys Asn Cys Leu Asn  Lys Gln Ile Ser Lys  Thr Gln Leu
    1925                1930                1935

Pro Asp  Thr Gly Tyr Ser Asp  Lys Ala Ser Lys Ser  Asn Ile Leu
    1940                1945                1950

Ser Val  Leu Leu Leu Gly Phe  Gly Phe Leu Ser Tyr  Ser Arg Lys
    1955                1960                1965

Arg Lys  Glu Lys Gln
    1970


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<212>  PRT
<213>  Staphylococcus epidermidis

<400>  23

Met Lys Ser Lys Pro Lys Leu Asn Gly Arg Asn Ile Cys Ser Phe Leu
1                5                    10                     15
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Leu Ser Lys Cys Met Ser Tyr Ser Leu Ser Lys Leu Ser Thr Leu Lys
            20   25   30

Thr Tyr Asn Phe Gln Ile Thr Ser Asn Asn Lys Glu Lys Thr Ser Arg
            35   40   45

Ile Gly Val Ala Ile Ala Leu Asn Asn Arg Asp Lys Leu Gln Lys Phe
        50   55   60

Ser Ile Arg Lys Tyr Ala Ile Gly Thr Phe Ser Thr Val Ile Ala Thr
65   70   75   80

Leu Val Phe Met Gly Ile Asn Thr Asn His Ala Ser Ala Asp Glu Leu
                85   90   95

Asn Gln Asn Gln Lys Leu Ile Lys Gln Leu Asn Gln Thr Asp Asp Asp
            100   105   110

Asp Ser Asn Thr His Ser Gln Glu Ile Glu Asn Asn Lys Gln Asn Ser
        115   120   125

Ser Gly Lys Thr Glu Ser Leu Arg Ser Ser Thr Ser Gln Asn Gln Ala
        130   135   140

Asn Ala Arg Leu Ser Asp Gln Phe Lys Asp Thr Asn Glu Thr Ser Gln
145   150   155   160

Gln Leu Pro Thr Asn Val Ser Asp Asp Ser Ile Asn Gln Ser His Ser
                165   170   175

Glu Ala Asn Met Asn Asn Glu Pro Leu Lys Val Asp Asn Ser Thr Met
            180   185   190

Gln Ala His Ser Lys Ile Val Ser Asp Ser Asp Gly Asn Ala Ser Glu
            195   200   205

Asn Lys His His Lys Leu Thr Glu Asn Val Leu Ala Glu Ser Arg Ala
        210   215   220

Ser Lys Asn Asp Lys Glu Lys Glu Asn Leu Gln Glu Lys Asp Lys Ser
225   230   235   240

```
Gln Gln Val His Pro Pro Leu Asp Lys Asn Ala Leu Gln Ala Phe Phe
            245             250             255

Asp Ala Ser Tyr His Asn Tyr Arg Met Ile Asp Arg Asp Arg Ala Asp
            260             265             270

Ala Thr Glu Tyr Gln Lys Val Lys Ser Thr Phe Asp Tyr Val Asn Asp
            275             280             285

Leu Leu Gly Asn Asn Gln Asn Ile Pro Ser Glu Gln Leu Val Ser Ala
    290             295             300

Tyr Gln Gln Leu Glu Lys Ala Leu Glu Leu Ala Arg Thr Leu Pro Gln
305             310             315             320

Gln Ser Thr Thr Glu Lys Arg Gly Arg Arg Ser Thr Arg Ser Val Val
            325             330             335

Glu Asn Arg Ser Ser Arg Ser Asp Tyr Leu Asp Ala Arg Thr Glu Tyr
            340             345             350

Tyr Val Ser Lys Asp Asp Asp Asp Ser Gly Phe Pro Pro Gly Thr Phe
            355             360             365

Phe His Ala Ser Asn Arg Arg Trp Pro Tyr Asn Leu Pro Arg Ser Arg
    370             375             380

Asn Ile Leu Arg Ala Ser Asp Val Gln Gly Asn Ala Tyr Ile Thr Thr
385             390             395             400

Lys Arg Leu Lys Asp Gly Tyr Gln Trp Asp Ile Leu Phe Asn Ser Asn
            405             410             415

His Lys Gly His Glu Tyr Met Tyr Tyr Trp Phe Gly Leu Pro Ser Asp
            420             425             430

Gln Thr Pro Thr Gly Pro Val Thr Phe Thr Ile Ile Asn Arg Asp Gly
            435             440             445

Ser Ser Thr Ser Thr Gly Gly Val Gly Phe Gly Ser Gly Ala Pro Leu
    450             455             460
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Pro Gln Phe Trp Arg Ser Ala Gly Ala Ile Asn Ser Ser Val Ala Asn
465   470   475   480

Asp Phe Lys His Gly Ser Ala Thr Asn Tyr Ala Phe Tyr Asp Gly Val
                485   490   495

Asn Asn Phe Ser Asp Phe Ala Arg Gly Gly Glu Leu Tyr Phe Asp Arg
                500   505   510

Glu Gly Ala Thr Gln Thr Asn Lys Tyr Tyr Gly Asp Glu Asn Phe Ala
                515   520   525

Leu Leu Asn Ser Glu Lys Pro Asp Gln Ile Arg Gly Leu Asp Thr Ile
        530   535   540

Tyr Ser Phe Lys Gly Ser Gly Asp Val Ser Tyr Arg Ile Ser Phe Lys
545   550   555   560

Thr Gln Gly Ala Pro Thr Ala Arg Leu Tyr Tyr Ala Ala Gly Ala Arg
                565   570   575

Ser Gly Glu Tyr Lys Gln Ala Thr Asn Tyr Asn Gln Leu Tyr Val Glu
                580   585   590

Pro Tyr Lys Asn Tyr Arg Asn Arg Val Gln Ser Asn Val Gln Val Lys
                595   600   605

Asn Arg Thr Leu His Leu Lys Arg Thr Ile Arg Gln Phe Asp Pro Thr
        610   615   620

Leu Gln Arg Thr Thr Asp Val Pro Ile Leu Asp Ser Asp Gly Ser Gly
625   630   635   640

Ser Ile Asp Ser Val Tyr Asp Pro Leu Ser Tyr Val Lys Asn Val Thr
                645   650   655

Gly Thr Val Leu Gly Ile Tyr Pro Ser Tyr Leu Pro Tyr Asn Gln Glu
                660   665   670

Arg Trp Gln Gly Ala Asn Ala Met Asn Ala Tyr Gln Ile Glu Glu Leu
        675   680   685

Phe Ser Gln Glu Asn Leu Gln Asn Ala Ala Arg Ser Gly Arg Pro Ile

Gln Phe Leu Val Gly Phe Asp Val Glu Asp Ser His His Asn Pro Glu
705   710   715   720

Thr Leu Leu Pro Val Asn Leu Tyr Val Lys Pro Glu Leu Lys His Thr
                      725   730   735

Ile Glu Leu Tyr His Asp Asn Glu Lys Gln Asn Arg Lys Glu Phe Ser
                      740   745   750

Val Ser Lys Arg Ala Gly His Gly Val Phe Gln Ile Met Ser Gly Thr
                      755   760   765

Leu His Asn Thr Val Gly Ser Gly Ile Leu Pro Tyr Gln Gln Glu Ile
          770   775   780

Arg Ile Lys Leu Thr Ser Asn Glu Pro Ile Lys Asp Ser Glu Trp Ser
785   790   795   800

Ile Thr Gly Tyr Pro Asn Thr Leu Thr Leu Gln Asn Ala Val Gly Arg
                      805   810   815

Thr Asn Asn Ala Thr Glu Lys Asn Leu Ala Leu Val Gly His Ile Asp
              820   825   830

Pro Gly Asn Tyr Phe Ile Thr Val Lys Phe Gly Asp Lys Val Glu Gln
          835   840   845

Phe Glu Ile Arg Ser Lys Pro Thr Pro Pro Arg Ile Ile Thr Thr Ala
    850   855   860

Asn Glu Leu Arg Gly Asn Ser Asn His Lys Pro Glu Ile Arg Val Thr
865   870   875   880

Asp Ile Pro Asn Asp Thr Thr Ala Lys Ile Lys Leu Val Met Gly Gly
                      885   890   895

Thr Asp Gly Asp His Asp Pro Glu Ile Asn Pro Tyr Thr Val Pro Glu
              900   905   910

Asn Tyr Thr Val Val Ala Glu Ala Tyr His Asp Asn Asp Pro Ser Lys
          915   920   925

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Asn Gly Val Leu Thr Phe Arg Ser Ser Asp Tyr Leu Lys Asp Leu Pro
    930                 935                 940

Leu Ser Gly Glu Leu Lys Ala Ile Val Tyr Tyr Asn Gln Tyr Val Gln
945                 950                 955                 960

Ser Asn Phe Ser Asn Ser Val Pro Phe Ser Ser Asp Thr Thr Pro Pro
                965                 970                 975

Thr Ile Asn Glu Pro Ala Gly Leu Val His Lys Tyr Tyr Arg Gly Asp
                980                 985                 990

His Val Glu Ile Thr Leu Pro Val  Thr Asp Asn Thr Gly  Gly Ser Gly
        995                 1000                1005

Leu Arg  Asp Val Asn Val Asn  Leu Pro Gln Gly Trp  Thr Lys Thr
    1010                1015                1020

Phe Thr  Ile Asn Pro Asn Asn  Asn Thr Glu Gly Thr  Leu Lys Leu
    1025                1030                1035

Ile Gly  Asn Ile Pro Ser Asn  Glu Ala Tyr Asn Thr  Thr Tyr His
    1040                1045                1050

Phe Asn  Ile Thr Ala Thr Asp  Asn Ser Gly Asn Thr  Thr Asn Pro
    1055                1060                1065

Ala Lys  Thr Phe Ile Leu Asn  Val Gly Lys Leu Ala  Asp Asp Leu
    1070                1075                1080

Asn Pro  Val Gly Leu Ser Arg  Asp Gln Leu Gln Leu  Val Thr Asp
    1085                1090                1095

Pro Ser  Ser Leu Ser Asn Ser  Glu Arg Glu Glu Val  Lys Arg Lys
    1100                1105                1110

Ile Ser  Glu Ala Asn Ala Asn  Ile Arg Ser Tyr Leu  Leu Gln Asn
    1115                1120                1125

Asn Pro  Ile Leu Ala Gly Val  Asn Gly Asp Val Thr  Phe Tyr Tyr
    1130                1135                1140
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Arg Asp  Gly Ser Val Asp Val  Ile Asp Ala Glu Asn  Val Ile Thr
    1145             1150              1155

Tyr Glu  Pro Glu Arg Lys Ser  Ile Phe Ser Glu Asn  Gly Asn Thr
    1160             1165              1170

Asn Lys  Lys Glu Ala Val Ile  Thr Ile Ala Arg Gly  Gln Asn Tyr
    1175             1180              1185

Thr Ile  Gly Pro Asn Leu Arg  Lys Tyr Phe Ser Leu  Ser Asn Gly
    1190             1195              1200

Ser Asp  Leu Pro Asn Arg Asp  Phe Thr Ser Ile Ser  Ala Ile Gly
    1205             1210              1215

Ser Leu  Pro Ser Ser Ser Glu  Ile Ser Arg Leu Asn  Val Gly Asn
    1220             1225              1230

Tyr Asn  Tyr Arg Val Asn Ala  Lys Asn Ala Tyr His  Lys Thr Gln
    1235             1240              1245

Gln Glu  Leu Asn Leu Lys Leu  Lys Ile Val Glu Val  Asn Ala Pro
    1250             1255              1260

Thr Gly  Asn Asn Arg Val Tyr  Arg Val Ser Thr Tyr  Asn Leu Thr
    1265             1270              1275

Asn Asp  Glu Ile Asn Lys Ile  Lys Gln Ala Phe Lys  Ala Ala Asn
    1280             1285              1290

Ser Gly  Leu Asn Leu Asn Asp  Asn Asp Ile Thr Val  Ser Asn Asn
    1295             1300              1305

Phe Asp  His Arg Asn Val Ser  Ser Val Thr Val Thr  Ile Arg Lys
    1310             1315              1320

Gly Asp  Leu Ile Lys Glu Phe  Ser Ser Asn Leu Asn  Asn Met Asn
    1325             1330              1335

Phe Leu  Arg Trp Val Asn Ile  Arg Asp Asp Tyr Thr  Ile Ser Trp
    1340             1345              1350
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Thr Ser Ser Lys Ile Gln Gly Arg Asn Thr Asp Gly Gly Leu Glu
    1355   1360   1365

Trp Ser Pro Asp His Lys Ser Leu Ile Tyr Lys Tyr Asp Ala Thr
    1370   1375   1380

Leu Gly Arg Gln Ile Asn Thr Asn Asp Val Leu Thr Leu Leu Gln
    1385   1390   1395

Ala Thr Ala Lys Asn Ser Asn Leu Arg Ser Asn Ile Asn Ser Asn
    1400   1405   1410

Glu Lys Gln Leu Ala Glu Arg Gly Ser Asn Gly Tyr Ser Lys Ser
    1415   1420   1425

Ile Ile Arg Asp Asp Gly Glu Lys Ser Tyr Leu Leu Asn Ser Asn
    1430   1435   1440

Pro Ile Gln Val Leu Asp Leu Val Glu Pro Asp Asn Gly Tyr Gly
    1445   1450   1455

Gly Arg Gln Val Ser His Ser Asn Val Ile Tyr Asn Glu Lys Asn
    1460   1465   1470

Ser Ser Ile Val Asn Gly Gln Val Pro Glu Ala Asn Gly Ala Ser
    1475   1480   1485

Ala Phe Asn Ile Asp Lys Val Val Lys Ala Asn Ala Ala Asn Asn
    1490   1495   1500

Gly Ile Met Gly Val Ile Tyr Lys Ala Gln Leu Tyr Leu Ala Pro
    1505   1510   1515

Tyr Ser Pro Lys Gly Tyr Ile Glu Lys Leu Gly Gln Asn Leu Ser
    1520   1525   1530

Asn Thr Asn Asn Val Ile Asn Val Tyr Phe Val Pro Ser Asp Lys
    1535   1540   1545

Val Asn Pro Ser Ile Thr Val Gly Asn Tyr Asp His His Thr Val
    1550   1555   1560

Tyr Ser Gly Glu Thr Phe Lys Asn Thr Ile Asn Val Asn Asp Asn

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        1565                    1570                    1575


Tyr Gly  Leu Asn Thr Val Ala  Ser Thr Ser Asp Ser  Ala Ile Thr
        1580                    1585                    1590


Met Thr  Arg Asn Asn Asn Glu  Leu Val Gly Gln Ala  Pro Asn Val
        1595                    1600                    1605


Thr Asn  Ser Thr Asn Lys Ile  Val Lys Val Lys Ala  Thr Asp Lys
        1610                    1615                    1620


Ser Gly  Asn Glu Ser Ile Val  Ser Phe Thr Val Asn  Ile Lys Pro
        1625                    1630                    1635


Leu Asn  Glu Lys Tyr Arg Ile  Thr Thr Ser Ser Ser  Asn Gln Thr
        1640                    1645                    1650


Pro Val  Arg Ile Ser Asn Ile  Gln Asn Asn Ala Asn  Leu Ser Ile
        1655                    1660                    1665


Glu Asp  Gln Asn Arg Val Lys  Ser Ser Leu Ser Met  Thr Lys Ile
        1670                    1675                    1680


Leu Gly  Thr Arg Asn Tyr Val  Asn Glu Ser Asn Asn  Asp Val Arg
        1685                    1690                    1695


Ser Gln  Val Val Ser Lys Val  Asn Arg Ser Gly Asn  Asn Ala Thr
        1700                    1705                    1710


Val Asn  Val Thr Thr Thr Phe  Ser Asp Gly Thr Thr  Asn Thr Ile
        1715                    1720                    1725


Thr Val  Pro Val Lys His Val  Leu Leu Glu Val Val  Pro Thr Thr
        1730                    1735                    1740


Arg Thr  Thr Val Arg Gly Gln  Gln Phe Pro Thr Gly  Lys Gly Thr
        1745                    1750                    1755


Ser Pro  Asn Asp Phe Phe Ser  Leu Arg Thr Gly Gly  Pro Val Asp
        1760                    1765                    1770


Ala Arg  Ile Val Trp Val Asn  Asn Gln Gly Pro Asp  Ile Asn Ser
        1775                    1780                    1785
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Asn Gln  Ile Gly Arg Asp Leu  Thr Leu His Ala Glu  Ile Phe Phe
    1790                 1795                 1800

Asp Gly  Glu Thr Thr Pro Ile  Arg Lys Asp Thr Thr  Tyr Lys Leu
    1805                 1810                 1815

Ser Gln  Ser Ile Pro Lys Gln  Ile Tyr Glu Thr Thr  Ile Asn Gly
    1820                 1825                 1830

Arg Phe  Asn Ser Ser Gly Asp  Ala Tyr Pro Gly Asn  Phe Val Gln
    1835                 1840                 1845

Ala Val  Asn Gln Tyr Trp Pro  Glu His Met Asp Phe  Arg Trp Ala
    1850                 1855                 1860

Gln Gly  Ser Gly Thr Pro Ser  Ser Arg Asn Ala Gly  Ser Phe Thr
    1865                 1870                 1875

Lys Thr  Val Thr Val Val Tyr  Gln Asn Gly Gln Thr  Glu Asn Val
    1880                 1885                 1890

Asn Val  Leu Phe Lys Val Lys  Pro Asn Lys Pro Val  Ile Asp Ser
    1895                 1900                 1905

Asn Ser  Val Ile Ser Lys Gly  Gln Leu Asn Gly Gln  Gln Ile Leu
    1910                 1915                 1920

Val Arg  Asn Val Pro Gln Asn  Ala Gln Val Thr Leu  Tyr Gln Ser
    1925                 1930                 1935

Asn Gly  Thr Val Ile Pro Asn  Thr Asn Thr Thr Ile  Asp Ser Asn
    1940                 1945                 1950

Gly Ile  Ala Thr Val Thr Ile  Gln Gly Thr Leu Pro  Thr Gly Asn
    1955                 1960                 1965

Ile Thr  Ala Lys Thr Ser Met  Thr Asn Asn Val Thr  Tyr Thr Lys
    1970                 1975                 1980

Gln Asn  Ser Ser Gly Ile Ala  Ser Asn Thr Thr Glu  Asp Ile Ser
    1985                 1990                 1995
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Val Phe Ser Glu Asn Ser Asp Gln Val Asn Val Thr Ala Gly Met
    2000   2005   2010

Gln Ala Lys Asn Asp Gly Ile Lys Ile Ile Lys Gly Thr Asn Tyr
    2015   2020   2025

Asn Phe Asn Asp Phe Asn Ser Phe Ile Ser Asn Ile Pro Ala His
    2030   2035   2040

Ser Thr Leu Thr Trp Asn Glu Glu Pro Asn Ser Trp Lys Asn Asn
    2045   2050   2055

Ile Gly Thr Thr Thr Lys Thr Val Thr Val Thr Leu Pro Asn His
    2060   2065   2070

Gln Gly Thr Arg Thr Val Asp Ile Pro Ile Thr Ile Tyr Pro Thr
    2075   2080   2085

Val Thr Ala Lys Asn Pro Val Arg Asp Gln Lys Gly Arg Asn Leu
    2090   2095   2100

Thr Asn Gly Thr Asp Val Tyr Asn Tyr Ile Ile Phe Glu Asn Asn
    2105   2110   2115

Asn Arg Leu Gly Gly Thr Ala Ser Trp Lys Asp Asn Arg Gln Pro
    2120   2125   2130

Asp Lys Asn Ile Ala Gly Val Gln Asn Leu Ile Ala Leu Val Asn
    2135   2140   2145

Tyr Pro Gly Ile Ser Thr Pro Leu Glu Val Pro Val Lys Val Trp
    2150   2155   2160

Val Tyr Asn Phe Asp Phe Thr Gln Pro Ile Tyr Lys Ile Gln Val
    2165   2170   2175

Gly Asp Thr Phe Pro Lys Gly Thr Trp Ala Gly Tyr Tyr Lys His
    2180   2185   2190

Leu Glu Asn Gly Glu Gly Leu Pro Ile Asp Gly Trp Lys Phe Tyr
    2195   2200   2205

Trp Asn Gln Gln Ser Thr Gly Thr Thr Ser Asp Gln Trp Gln Ser
    2210   2215   2220

Leu Ala Tyr Thr Arg Thr Pro Phe Val Lys Thr Gly Thr Tyr Asp
    2225   2230   2235

Val Val Asn Pro Ser Asn Trp Gly Val Trp Gln Thr Ser Gln Ser
    2240   2245   2250

Ala Lys Phe Ile Val Thr Asn Ala Lys Pro Asn Gln Pro Thr Ile
    2255   2260   2265

Thr Gln Ser Lys Thr Gly Asp Val Thr Val Thr Pro Gly Ala Val
    2270   2275   2280

Arg Asn Ile Leu Ile Ser Gly Thr Asn Asp Tyr Ile Gln Ala Ser
    2285   2290   2295

Ala Asp Lys Ile Val Ile Asn Lys Asn Gly Asn Lys Leu Thr Thr
    2300   2305   2310

Phe Val Lys Asn Asn Asp Gly Arg Trp Thr Val Glu Thr Gly Ser
    2315   2320   2325

Pro Asp Ile Asn Gly Ile Gly Pro Thr Asn Asn Gly Thr Ala Ile
    2330   2335   2340

Ser Leu Ser Arg Leu Ala Val Arg Pro Gly Asp Ser Ile Glu Ala
    2345   2350   2355

Ile Ala Thr Glu Gly Ser Gly Glu Thr Ile Ser Thr Ser Ala Thr
    2360   2365   2370

Ser Glu Ile Tyr Ile Val Lys Ala Pro Gln Pro Glu Gln Val Ala
    2375   2380   2385

Thr His Thr Tyr Asp Asn Gly Thr Phe Asp Ile Leu Pro Asp Asn
    2390   2395   2400

Ser Arg Asn Ser Leu Asn Pro Thr Glu Arg Val Glu Ile Asn Tyr
    2405   2410   2415

Thr Glu Lys Leu Asn Gly Asn Glu Thr Gln Lys Ser Phe Thr Ile

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                2420                      2425                      2430


Thr Lys  Asn Asn Asn Gly Lys  Trp Thr Ile Asn Asn  Lys Pro Asn
     2435                 2440                 2445


Tyr Val  Glu Phe Asn Gln Asp  Asn Gly Lys Val Val  Phe Ser Ala
     2450                 2455                 2460


Asn Thr  Ile Lys Pro Asn Ser  Gln Ile Thr Ile Thr  Pro Lys Ala
     2465                 2470                 2475


Gly Gln  Gly Asn Thr Glu Asn  Thr Asn Pro Thr Val  Ile Gln Ala
     2480                 2485                 2490


Pro Ala  Gln His Thr Leu Thr  Ile Asn Glu Ile Val  Lys Glu Gln
     2495                 2500                 2505


Gly Gln  Asn Val Thr Asn Asp  Asp Ile Asn Asn Ala  Val Gln Val
     2510                 2515                 2520


Pro Asn  Lys Asn Arg Val Ala  Ile Lys Gln Gly Asn  Ala Leu Pro
     2525                 2530                 2535


Thr Asn  Leu Ala Gly Gly Ser  Thr Ser His Ile Pro  Val Val Ile
     2540                 2545                 2550


Tyr Tyr  Ser Asp Gly Ser Ser  Glu Glu Ala Thr Glu  Thr Val Arg
     2555                 2560                 2565


Thr Lys  Val Asn Lys Thr Glu  Leu Ile Asn Ala Arg  Arg Arg Leu
     2570                 2575                 2580


Asp Glu  Glu Ile Ser Lys Glu  Asn Lys Thr Pro Ser  Ser Ile Arg
     2585                 2590                 2595


Asn Phe  Asp Gln Ala Met Asn  Arg Ala Gln Ser Gln  Ile Asn Thr
     2600                 2605                 2610


Ala Lys  Ser Asp Ala Asp Gln  Val Ile Gly Thr Glu  Phe Ala Thr
     2615                 2620                 2625


Pro Gln  Gln Val Asn Ser Ala  Leu Ser Lys Val Gln  Ala Ala Gln
     2630                 2635                 2640
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Asn Lys Ile Asn Glu Ala Lys Ala Leu Leu Gln Asn Lys Ala Asp
    2645   2650   2655

Asn Ser Gln Leu Val Arg Ala Lys Glu Gln Leu Gln Gln Ser Ile
    2660   2665   2670

Gln Pro Ala Ala Ser Thr Asp Gly Met Thr Gln Asp Ser Thr Arg
    2675   2680   2685

Asn Tyr Lys Asn Lys Arg Gln Ala Ala Glu Gln Ala Ile Gln His
    2690   2695   2700

Ala Asn Ser Val Ile Asn Asn Gly Asp Ala Thr Ser Gln Gln Ile
    2705   2710   2715

Asn Asp Ala Lys Asn Thr Val Glu Gln Ala Gln Arg Asp Tyr Val
    2720   2725   2730

Glu Ala Lys Ser Asn Leu Arg Ala Asp Lys Ser Gln Leu Gln Ser
    2735   2740   2745

Ala Tyr Asp Thr Leu Asn Arg Asp Val Leu Thr Asn Asp Lys Lys
    2750   2755   2760

Pro Ala Ser Val Arg Arg Tyr Asn Glu Ala Ile Ser Asn Ile Arg
    2765   2770   2775

Lys Glu Leu Asp Thr Ala Lys Ala Asp Ala Ser Ser Thr Leu Arg
    2780   2785   2790

Asn Thr Asn Pro Ser Val Glu Gln Val Arg Asp Ala Leu Asn Lys
    2795   2800   2805

Ile Asn Thr Val Gln Pro Lys Val Asn Gln Ala Ile Ala Leu Leu
    2810   2815   2820

Gln Pro Lys Glu Asn Asn Ser Glu Leu Val Gln Ala Lys Lys Arg
    2825   2830   2835

Leu Gln Asp Ala Val Asn Asp Ile Pro Gln Thr Gln Gly Met Thr
    2840   2845   2850

Gln Gln Thr Ile Asn Asn Tyr Asn Asp Lys Gln Arg Glu Ala Glu
    2855   2860   2865

Arg Ala Leu Thr Ser Ala Gln Arg Val Ile Asp Asn Gly Asp Ala
    2870   2875   2880

Thr Thr Gln Glu Ile Thr Ser Glu Lys Ser Lys Val Glu Gln Ala
    2885   2890   2895

Met Gln Ala Leu Thr Asn Ala Lys Ser Asn Leu Arg Ala Asp Lys
    2900   2905   2910

Asn Glu Leu Gln Thr Ala Tyr Asn Lys Leu Ile Glu Asn Val Ser
    2915   2920   2925

Thr Asn Gly Lys Lys Pro Ala Ser Ile Arg Gln Tyr Glu Thr Ala
    2930   2935   2940

Lys Ala Arg Ile Gln Asn Gln Ile Asn Asp Ala Lys Asn Glu Ala
    2945   2950   2955

Glu Arg Ile Leu Gly Asn Asp Asn Pro Gln Val Ser Gln Val Thr
    2960   2965   2970

Gln Ala Leu Asn Lys Ile Lys Ala Ile Gln Pro Lys Leu Thr Glu
    2975   2980   2985

Ala Ile Asn Met Leu Gln Asn Lys Glu Asn Asn Thr Glu Leu Val
    2990   2995   3000

Asn Ala Lys Asn Arg Leu Glu Asn Ala Val Asn Asp Thr Asp Pro
    3005   3010   3015

Thr His Gly Met Thr Gln Glu Thr Ile Asn Asn Tyr Asn Ala Lys
    3020   3025   3030

Lys Arg Glu Ala Gln Asn Glu Ile Gln Lys Ala Asn Met Ile Ile
    3035   3040   3045

Asn Asn Gly Asp Ala Thr Ala Gln Asp Ile Ser Ser Glu Lys Ser
    3050   3055   3060

Lys Val Glu Gln Val Leu Gln Ala Leu Gln Asn Ala Lys Asn Asp
    3065   3070   3075

Leu Arg Ala Asp Lys Arg Glu Leu Gln Thr Ala Tyr Asn Lys Leu
    3080   3085   3090

Ile Gln Asn Val Asn Thr Asn Gly Lys Lys Pro Ser Ser Ile Gln
    3095   3100   3105

Asn Tyr Lys Ser Ala Arg Arg Asn Ile Glu Asn Gln Tyr Asn Thr
    3110   3115   3120

Ala Lys Asn Glu Ala His Asn Val Leu Glu Asn Thr Asn Pro Thr
    3125   3130   3135

Val Asn Ala Val Glu Asp Ala Leu Arg Lys Ile Asn Ala Ile Gln
    3140   3145   3150

Pro Glu Val Thr Lys Ala Ile Asn Ile Leu Gln Asp Lys Glu Asp
    3155   3160   3165

Asn Ser Glu Leu Val Arg Ala Lys Glu Lys Leu Asp Gln Ala Ile
    3170   3175   3180

Asn Ser Gln Pro Ser Leu Asn Gly Met Thr Gln Glu Ser Ile Asn
    3185   3190   3195

Asn Tyr Thr Thr Lys Arg Arg Glu Ala Gln Asn Ile Ala Ser Ser
    3200   3205   3210

Ala Asp Thr Ile Ile Asn Asn Gly Asp Ala Ser Ile Glu Gln Ile
    3215   3220   3225

Thr Glu Asn Lys Ile Arg Val Glu Glu Ala Thr Asn Ala Leu Asn
    3230   3235   3240

Glu Ala Lys Gln His Leu Thr Ala Asp Thr Thr Ser Leu Lys Thr
    3245   3250   3255

Glu Val Arg Lys Leu Ser Arg Arg Gly Asp Thr Asn Asn Lys Lys
    3260   3265   3270

Pro Ser Ser Val Ser Ala Tyr Asn Asn Thr Ile His Ser Leu Gln

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          3275                    3280                    3285


Ser Glu  Ile Thr Gln Thr Glu  Asn Arg Ala Asn Thr  Ile Ile Asn
    3290                    3295                    3300


Lys Pro  Ile Arg Ser Val Glu  Glu Val Asn Asn Ala  Leu His Glu
    3305                    3310                    3315


Val Asn  Gln Leu Asn Gln Arg  Leu Thr Asp Thr Ile  Asn Leu Leu
    3320                    3325                    3330


Gln Pro  Leu Ala Asn Lys Glu  Ser Leu Lys Glu Ala  Arg Asn Arg
    3335                    3340                    3345


Leu Glu  Ser Lys Ile Asn Glu  Thr Val Gln Thr Asp  Gly Met Thr
    3350                    3355                    3360


Gln Gln  Ser Val Glu Asn Tyr  Lys Gln Ala Lys Ile  Lys Ala Gln
    3365                    3370                    3375


Asn Glu  Ser Ser Ile Ala Gln  Thr Leu Ile Asn Asn  Gly Asp Ala
    3380                    3385                    3390


Ser Asp  Gln Glu Val Ser Thr  Glu Ile Glu Lys Leu  Asn Gln Lys
    3395                    3400                    3405


Leu Ser  Glu Leu Thr Asn Ser  Ile Asn His Leu Thr  Val Asn Lys
    3410                    3415                    3420


Glu Pro  Leu Glu Thr Ala Lys  Asn Gln Leu Gln Ala  Asn Ile Asp
    3425                    3430                    3435


Gln Lys  Pro Ser Thr Asp Gly  Met Thr Gln Gln Ser  Val Gln Ser
    3440                    3445                    3450


Tyr Glu  Arg Lys Leu Gln Glu  Ala Lys Asp Lys Ile  Asn Ser Ile
    3455                    3460                    3465


Asn Asn  Val Leu Ala Asn Asn  Pro Asp Val Asn Ala  Ile Arg Thr
    3470                    3475                    3480


Asn Lys  Val Glu Thr Glu Gln  Ile Asn Asn Glu Leu  Thr Gln Ala
    3485                    3490                    3495
```

Lys Gln Gly Leu Thr Val Asp Lys Gln Pro Leu Ile Asn Ala Lys
    3500   3505   3510

Thr Ala Leu Gln Gln Ser Leu Asp Asn Gln Pro Ser Thr Thr Gly
    3515   3520   3525

Met Thr Glu Ala Thr Ile Gln Asn Tyr Asn Ala Lys Arg Gln Lys
    3530   3535   3540

Ala Glu Gln Val Ile Gln Asn Ala Asn Lys Ile Ile Glu Asn Ala
    3545   3550   3555

Gln Pro Ser Val Gln Gln Val Ser Asp Glu Lys Ser Lys Val Glu
    3560   3565   3570

Gln Ala Leu Ser Glu Leu Asn Asn Ala Lys Ser Ala Leu Arg Ala
    3575   3580   3585

Asp Lys Gln Glu Leu Gln Gln Ala Tyr Asn Gln Leu Ile Gln Pro
    3590   3595   3600

Thr Asp Leu Asn Asn Lys Lys Pro Ala Ser Ile Thr Ala Tyr Asn
    3605   3610   3615

Gln Arg Tyr Gln Gln Phe Ser Asn Glu Leu Asn Ser Thr Lys Thr
    3620   3625   3630

Asn Thr Asp Arg Ile Leu Lys Glu Gln Asn Pro Ser Val Ala Asp
    3635   3640   3645

Val Asn Asn Ala Leu Asn Lys Val Arg Glu Val Gln Gln Lys Leu
    3650   3655   3660

Asn Glu Ala Arg Ala Leu Leu Gln Asn Lys Glu Asp Asn Ser Ala
    3665   3670   3675

Leu Val Arg Ala Lys Glu Gln Leu Gln Gln Ala Val Asp Gln Val
    3680   3685   3690

Pro Ser Thr Glu Gly Met Thr Gln Gln Thr Lys Asp Asp Tyr Asn
    3695   3700   3705

Ser Lys Gln Gln Ala Ala Gln Gln Glu Ile Ser Lys Ala Gln Gln
    3710   3715   3720

Val Ile Asp Asn Gly Asp Ala Thr Thr Gln Gln Ile Ser Asn Ala
    3725   3730   3735

Lys Thr Asn Val Glu Arg Ala Leu Glu Ala Leu Asn Asn Ala Lys
    3740   3745   3750

Thr Gly Leu Arg Ala Asp Lys Glu Glu Leu Gln Asn Ala Tyr Asn
    3755   3760   3765

Gln Leu Thr Gln Asn Ile Asp Thr Ser Gly Lys Thr Pro Ala Ser
    3770   3775   3780

Ile Arg Lys Tyr Asn Glu Ala Lys Ser Arg Ile Gln Thr Gln Ile
    3785   3790   3795

Asp Ser Ala Lys Asn Glu Ala Asn Ser Ile Leu Thr Asn Asp Asn
    3800   3805   3810

Pro Gln Val Ser Gln Val Thr Ala Ala Leu Asn Lys Ile Lys Ala
    3815   3820   3825

Val Gln Pro Glu Leu Asp Lys Ala Ile Ala Met Leu Lys Asn Lys
    3830   3835   3840

Glu Asn Asn Asn Ala Leu Val Gln Ala Lys Gln Gln Leu Gln Gln
    3845   3850   3855

Ile Val Asn Glu Val Asp Pro Thr Gln Gly Met Thr Thr Asp Thr
    3860   3865   3870

Ala Asn Asn Tyr Lys Ser Lys Lys Arg Glu Ala Glu Asp Glu Ile
    3875   3880   3885

Gln Lys Ala Gln Gln Ile Ile Asn Asn Gly Asp Ala Thr Glu Gln
    3890   3895   3900

Gln Ile Thr Asn Glu Thr Asn Arg Val Asn Gln Ala Ile Asn Ala
    3905   3910   3915

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Ile Asn  Lys Ala Lys Asn Asp  Leu Arg Ala Asp Lys  Ser Gln Leu
    3920             3925             3930

Glu Asn  Ala Tyr Asn Gln Leu  Ile Gln Asn Val Asp  Thr Asn Gly
    3935             3940             3945

Lys Lys  Pro Ala Ser Ile Gln  Gln Tyr Gln Ala Ala  Arg Gln Ala
    3950             3955             3960

Ile Glu  Thr Gln Tyr Asn Asn  Ala Lys Ser Glu Ala  His Gln Ile
    3965             3970             3975

Leu Glu  Asn Ser Asn Pro Ser  Val Asn Glu Val Ala  Gln Ala Leu
    3980             3985             3990

Gln Lys  Val Glu Ala Val Gln  Leu Lys Val Asn Asp  Ala Ile His
    3995             4000             4005

Ile Leu  Gln Asn Lys Glu Asn  Asn Ser Ala Leu Val  Thr Ala Lys
    4010             4015             4020

Asn Gln  Leu Gln Gln Ser Val  Asn Asp Gln Pro Leu  Thr Thr Gly
    4025             4030             4035

Met Thr  Gln Asp Ser Ile Asn  Asn Tyr Glu Ala Lys  Arg Asn Glu
    4040             4045             4050

Ala Gln  Ser Ala Ile Arg Asn  Ala Glu Ala Val Ile  Asn Asn Gly
    4055             4060             4065

Asp Ala  Thr Ala Lys Gln Ile  Ser Asp Glu Lys Ser  Lys Val Glu
    4070             4075             4080

Gln Ala  Leu Ala His Leu Asn  Asp Ala Lys Gln Gln  Leu Thr Ala
    4085             4090             4095

Asp Thr  Thr Glu Leu Gln Thr  Ala Val Gln Gln Leu  Asn Arg Arg
    4100             4105             4110

Gly Asp  Thr Asn Asn Lys Lys  Pro Arg Ser Ile Asn  Ala Tyr Asn
    4115             4120             4125

Lys Ala  Ile Gln Ser Leu Glu  Thr Gln Ile Thr Ser  Ala Lys Asp
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          4130                    4135                    4140

Asn Ala  Asn Ala Val Ile Gln  Lys Pro Ile Arg Thr  Val Gln Glu
     4145                    4150                    4155


Val Asn  Asn Ala Leu Gln Gln  Val Asn Gln Leu Asn  Gln Gln Leu
     4160                    4165                    4170


Thr Glu  Ala Ile Asn Gln Leu  Gln Pro Leu Ser Asn  Asn Asp Ala
     4175                    4180                    4185


Leu Lys  Ala Ala Arg Leu Asn  Leu Glu Asn Lys Ile  Asn Gln Thr
     4190                    4195                    4200


Val Gln  Thr Asp Gly Met Thr  Gln Gln Ser Ile Glu  Ala Tyr Gln
     4205                    4210                    4215


Asn Ala  Lys Arg Val Ala Gln  Asn Glu Ser Asn Thr  Ala Leu Ala
     4220                    4225                    4230


Leu Ile  Asn Asn Gly Asp Ala  Asp Glu Gln Gln Ile  Thr Thr Glu
     4235                    4240                    4245


Thr Asp  Arg Val Asn Gln Gln  Thr Thr Asn Leu Thr  Gln Ala Ile
     4250                    4255                    4260


Asn Gly  Leu Thr Val Asn Lys  Glu Pro Leu Glu Thr  Ala Lys Thr
     4265                    4270                    4275


Ala Leu  Gln Asn Asn Ile Asp  Gln Val Pro Ser Thr  Asp Gly Met
     4280                    4285                    4290


Thr Gln  Gln Ser Val Ala Asn  Tyr Asn Gln Lys Leu  Gln Ile Ala
     4295                    4300                    4305


Lys Asn  Glu Ile Asn Thr Ile  Asn Asn Val Leu Ala  Asn Asn Pro
     4310                    4315                    4320


Asp Val  Asn Ala Ile Lys Thr  Asn Lys Ala Glu Ala  Glu Arg Ile
     4325                    4330                    4335


Ser Asn  Asp Leu Thr Gln Ala  Lys Asn Asn Leu Gln  Val Asp Thr
     4340                    4345                    4350
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Gln Pro  Leu Glu Lys Ile Lys  Arg Gln Leu Gln Asp  Glu Ile Asp
    4355             4360             4365

Gln Gly  Thr Asn Thr Asp Gly  Met Thr Gln Asp Ser  Val Asp Asn
    4370             4375             4380

Tyr Asn  Asp Ser Leu Ser Ala  Ala Ile Ile Glu Lys  Gly Lys Val
    4385             4390             4395

Asn Lys  Leu Leu Lys Arg Asn  Pro Thr Val Glu Gln  Val Lys Glu
    4400             4405             4410

Ser Val  Ala Asn Ala Gln Gln  Val Ile Gln Asp Leu  Gln Asn Ala
    4415             4420             4425

Arg Thr  Ser Leu Val Pro Asp  Lys Thr Gln Leu Gln  Glu Ala Lys
    4430             4435             4440

Asn Arg  Leu Glu Asn Ser Ile  Asn Gln Gln Thr Asp  Thr Asp Gly
   ·4445             4450             4455

Met Thr  Gln Asp Ser Leu Asn  Asn Tyr Asn Asp Lys  Leu Ala Lys
    4460             4465             4470

Ala Arg  Gln Asn Leu Glu Lys  Ile Ser Lys Val Leu  Gly Gly Gln
    4475             4480             4485

Pro Thr  Val Ala Glu Ile Arg  Gln Asn Thr Asp Glu  Ala Asn Ala
    4490             4495             4500

His Lys  Gln Ala Leu Asp Thr  Ala Arg Ser Gln Leu  Thr Leu Asn
    4505             4510             4515

Arg Glu  Pro Tyr Ile Asn His  Ile Asn Asn Glu Ser  His Leu Asn
    4520             4525             4530

Asn Ala  Gln Lys Asp Asn Phe  Lys Ala Gln Val Asn  Ser Ala Pro
    4535             4540             4545

Asn His  Asn Thr Leu Glu Thr  Ile Lys Asn Lys Ala  Asp Thr Leu
    4550             4555             4560
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Asn Gln Ser Met Thr Ala Leu Ser Glu Ser Ile Ala Asp Tyr Glu
    4565   4570   4575

Asn Gln Lys Gln Gln Glu Asn Tyr Leu Asp Ala Ser Asn Asn Lys
    4580   4585   4590

Arg Gln Asp Tyr Asp Asn Ala Val Asn Ala Ala Lys Gly Ile Leu
    4595   4600   4605

Asn Gln Thr Gln Ser Pro Thr Met Ser Ala Asp Val Ile Asp Gln
    4610   4615   4620

Lys Ala Glu Asp Val Lys Arg Thr Lys Thr Ala Leu Asp Gly Asn
    4625   4630   4635

Gln Arg Leu Glu Val Ala Lys Gln Gln Ala Leu Asn His Leu Asn
    4640   4645   4650

Thr Leu Asn Asp Leu Asn Asp Ala Gln Arg Gln Thr Leu Thr Asp
    4655   4660   4665

Thr Ile Asn His Ser Pro Asn Ile Asn Ser Val Asn Gln Ala Lys
    4670   4675   4680

Glu Lys Ala Asn Thr Val Asn Thr Ala Met Thr Gln Leu Lys Gln
    4685   4690   4695

Thr Ile Ala Asn Tyr Asp Asp Glu Leu His Asp Gly Asn Tyr Ile
    4700   4705   4710

Asn Ala Asp Lys Asp Lys Lys Asp Ala Tyr Asn Asn Ala Val Asn
    4715   4720   4725

Asn Ala Lys Gln Leu Ile Asn Gln Ser Asp Ala Asn Gln Ala Gln
    4730   4735   4740

Leu Asp Pro Ala Glu Ile Asn Lys Val Thr Gln Arg Val Asn Thr
    4745   4750   4755

Thr Lys Asn Asp Leu Asn Gly Asn Asp Lys Leu Ala Glu Ala Lys
    4760   4765   4770

Arg Asp Ala Asn Thr Thr Ile Asp Gly Leu Thr Tyr Leu Asn Glu
    4775   4780   4785

Ala Gln Arg Asn Lys Ala Lys Glu Asn Val Gly Lys Ala Ser Thr
    4790   4795   4800

Lys Thr Asn Ile Thr Ser Gln Leu Gln Asp Tyr Asn Gln Leu Asn
    4805   4810   4815

Ile Ala Met Gln Ala Leu Arg Asn Ser Val Asn Asp Val Asn Asn
    4820   4825   4830

Val Lys Ala Asn Ser Asn Tyr Ile Asn Glu Asp Asn Gly Pro Lys
    4835   4840   4845

Glu Ala Tyr Asn Gln Ala Val Thr His Ala Gln Thr Leu Ile Asn
    4850   4855   4860

Ala Gln Ser Asn Pro Glu Met Ser Arg Asp Val Val Asn Gln Lys
    4865   4870   4875

Thr Gln Ala Val Asn Thr Ala His Gln Asn Leu His Gly Gln Gln
    4880   4885   4890

Lys Leu Glu Gln Ala Gln Ser Ser Ala Asn Thr Glu Ile Gly Asn
    4895   4900   4905

Leu Pro Asn Leu Thr Asn Thr Gln Lys Ala Lys Glu Lys Glu Leu
    4910   4915   4920

Val Asn Ser Lys Gln Thr Arg Thr Glu Val Gln Glu Gln Leu Asn
    4925   4930   4935

Gln Ala Lys Ser Leu Asp Ser Ser Met Gly Thr Leu Lys Ser Leu
    4940   4945   4950

Val Ala Lys Gln Pro Thr Val Gln Lys Thr Ser Val Tyr Ile Asn
    4955   4960   4965

Glu Asp Gln Pro Glu Gln Ser Ala Tyr Asn Asp Ser Ile Thr Met
    4970   4975   4980

Gly Gln Thr Ile Ile Asn Lys Thr Ala Asp Pro Val Leu Asp Lys

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          4985                    4990                   4995


Thr Leu  Val Asp Asn Ala Ile  Ser Asn Ile Ser Thr  Lys Glu Asn
     5000                    5005                 5010


Ala Leu  His Gly Glu Gln Lys  Leu Thr Thr Ala Lys  Thr Glu Ala
     5015                    5020                 5025


Ile Asn  Ala Leu Asn Thr Leu  Ala Asp Leu Asn Thr  Pro Gln Lys
     5030                    5035                 5040


Glu Ala  Ile Lys Thr Ala Ile  Asn Thr Ala His Thr  Arg Thr Asp
     5045                    5050                 5055


Val Thr  Ala Glu Gln Ser Lys  Ala Asn Gln Ile Asn  Ser Ala Met
     5060                    5065                 5070


His Thr  Leu Arg Gln Asn Ile  Ser Asp Asn Glu Ser  Val Thr Asn
     5075                    5080                 5085


Glu Ser  Asn Tyr Ile Asn Ala  Glu Pro Glu Lys Gln  His Ala Phe
     5090                    5095                 5100


Thr Glu  Ala Leu Asn Asn Ala  Lys Glu Ile Val Asn  Glu Gln Gln
     5105                    5110                 5115


Ala Thr  Leu Asp Ala Asn Ser  Ile Asn Gln Lys Ala  Gln Ala Ile
     5120                    5125                 5130


Leu Thr  Thr Lys Asn Ala Leu  Asp Gly Glu Glu Gln  Leu Arg Arg
     5135                    5140                 5145


Ala Lys  Glu Asn Ala Asp Gln  Glu Ile Asn Thr Leu  Asn Gln Leu
     5150                    5155                 5160


Thr Asp  Ala Gln Arg Asn Ser  Glu Lys Gly Leu Val  Asn Ser Ser
     5165                    5170                 5175


Gln Thr  Arg Thr Glu Val Ala  Ser Gln Leu Ala Lys  Ala Lys Glu
     5180                    5185                 5190


Leu Asn  Lys Val Met Glu Gln  Leu Asn His Leu Ile  Asn Gly Lys
     5195                    5200                 5205
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Asn Gln  Met Ile Asn Ser Ser  Lys Phe Ile Asn Glu  Asp Ala Asn
    5210                5215             5220

Gln Gln  Gln Ala Tyr Ser Asn  Ala Ile Ala Ser Ala  Glu Ala Leu
    5225                5230             5235

Lys Asn  Lys Ser Gln Asn Pro  Glu Leu Asp Lys Val  Thr Ile Glu
    5240                5245             5250

Gln Ala  Ile Asn Asn Ile Asn  Ser Ala Ile Asn Asn  Leu Asn Gly
    5255                5260             5265

Glu Ala  Lys Leu Thr Lys Ala  Lys Glu Asp Ala Val  Ala Ser Ile
    5270                5275             5280

Asn Asn  Leu Ser Gly Leu Thr  Asn Glu Gln Lys Pro  Lys Glu Asn
    5285                5290             5295

Gln Ala  Val Asn Gly Ala Gln  Thr Arg Asp Gln Val  Ala Asn Lys
    5300                5305             5310

Leu Arg  Asp Ala Glu Ala Leu  Asp Gln Ser Met Gln  Thr Leu Arg
    5315                5320             5325

Asp Leu  Val Asn Asn Gln Asn  Ala Ile His Ser Thr  Ser Asn Tyr
    5330                5335             5340

Phe Asn  Glu Asp Ser Thr Gln  Lys Asn Thr Tyr Asp  Asn Ala Ile
    5345                5350             5355

Asp Asn  Gly Ser Thr Tyr Ile  Thr Gly Gln His Asn  Pro Glu Leu
    5360                5365             5370

Asn Lys  Ser Thr Ile Asp Gln  Thr Ile Ser Arg Ile  Asn Thr Ala
    5375                5380             5385

Lys Asn  Asp Leu His Gly Val  Glu Lys Leu Gln Arg  Asp Lys Gly
    5390                5395             5400

Thr Ala  Asn Gln Glu Ile Gly  Gln Leu Gly Tyr Leu  Asn Asp Pro
    5405                5410             5415
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Gln Lys Ser Gly Glu Glu Ser Leu Val Asn Gly Ser Asn Thr Arg
    5420   5425   5430

Ser Glu Val Glu Glu His Leu Asn Glu Ala Lys Ser Leu Asn Asn
    5435   5440   5445

Ala Met Lys Gln Leu Arg Asp Lys Val Ala Glu Lys Thr Asn Val
    5450   5455   5460

Lys Gln Ser Ser Asp Tyr Ile Asn Asp Ser Thr Glu His Gln Arg
    5465   5470   5475

Gly Tyr Asp Gln Ala Leu Gln Glu Ala Glu Asn Ile Ile Asn Glu
    5480   5485   5490

Ile Gly Asn Pro Thr Leu Asn Lys Ser Glu Ile Glu Gln Lys Leu
    5495   5500   5505

Gln Gln Leu Thr Asp Ala Gln Asn Ala Leu Gln Gly Ser His Leu
    5510   5515   5520

Leu Glu Glu Ala Lys Asn Asn Ala Ile Thr Gly Ile Asn Lys Leu
    5525   5530   5535

Thr Ala Leu Asn Asp Ala Gln Arg Gln Lys Ala Ile Glu Asn Val
    5540   5545   5550

Gln Ala Gln Gln Thr Ile Pro Ala Val Asn Gln Gln Leu Thr Leu
    5555   5560   5565

Asp Arg Glu Ile Asn Thr Ala Met Gln Ala Leu Arg Asp Lys Val
    5570   5575   5580

Gly Gln Gln Asn Asn Val His Gln Gln Ser Asn Tyr Phe Asn Glu
    5585   5590   5595

Asp Glu Gln Pro Lys His Asn Tyr Asp Asn Ser Val Gln Ala Gly
    5600   5605   5610

Gln Thr Ile Ile Asp Lys Leu Gln Asp Pro Ile Met Asn Lys Asn
    5615   5620   5625

Glu Ile Glu Gln Ala Ile Asn Gln Ile Asn Thr Thr Gln Thr Ala
    5630   5635   5640

Leu Ser Gly Glu Asn Lys Leu His Thr Asp Gln Glu Ser Thr Asn
    5645   5650   5655

Arg Gln Ile Glu Gly Leu Ser Ser Leu Asn Thr Ala Gln Ile Asn
    5660   5665   5670

Ala Glu Lys Asp Leu Val Asn Gln Ala Lys Thr Arg Thr Asp Val
    5675   5680   5685

Ala Gln Lys Leu Ala Ala Ala Lys Glu Ile Asn Ser Ala Met Ser
    5690   5695   5700

Asn Leu Arg Asp Gly Ile Gln Asn Lys Glu Asp Ile Lys Arg Ser
    5705   5710   5715

Ser Ala Tyr Ile Asn Ala Asp Pro Thr Lys Val Thr Ala Tyr Asp
    5720   5725   5730

Gln Ala Leu Gln Asn Ala Glu Asn Ile Ile Asn Ala Thr Pro Asn
    5735   5740   5745

Val Glu Leu Asn Lys Ala Thr Ile Glu Gln Ala Leu Ser Arg Val
    5750   5755   5760

Gln Gln Ala Gln Gln Asp Leu Asp Gly Val Gln Gln Leu Ala Asn
    5765   5770   5775

Ala Lys Gln Gln Ala Thr Gln Thr Val Asn Gly Leu Asn Ser Leu
    5780   5785   5790

Asn Asp Gly Gln Lys Arg Glu Leu Asn Leu Leu Ile Asn Ser Ala
    5795   5800   5805

Asn Thr Arg Thr Lys Val Gln Glu Glu Leu Asn Lys Ala Thr Glu
    5810   5815   5820

Leu Asn His Ala Met Glu Ala Leu Arg Asn Ser Val Gln Asn Val
    5825   5830   5835

Asp Gln Val Lys Gln Ser Ser Asn Tyr Val Asn Glu Asp Gln Pro

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              5840                    5845                        5850


Glu Gln  His Asn Tyr Asp Asn  Ala Val Asn Glu Ala  Gln Ala Thr
     5855                5860                5865


Ile Asn  Asn Asn Ala Gln Pro  Val Leu Asp Lys Leu  Ala Ile Glu
     5870                5875                5880


Arg Leu  Thr Gln Thr Val Asn  Thr Thr Lys Asp Ala  Leu His Gly
     5885                5890                5895


Ala Gln  Lys Leu Thr Gln Asp  Gln Gln Ala Ala Glu  Thr Gly Ile
     5900                5905                5910


Arg Gly  Leu Thr Ser Leu Asn  Glu Pro Gln Lys Asn  Ala Glu Val
     5915                5920                5925


Ala Lys  Val Thr Ala Ala Thr  Thr Arg Asp Glu Val  Arg Asn Ile
     5930                5935                5940


Arg Gln  Glu Ala Thr Thr Leu  Asp Thr Ala Met Leu  Gly Leu Arg
     5945                5950                5955


Lys Ser  Ile Lys Asp Lys Asn  Asp Thr Lys Asn Ser  Ser Lys Tyr
     5960                5965                5970


Ile Asn  Glu Asp His Asp Gln  Gln Gln Ala Tyr Asp  Asn Ala Val
     5975                5980                5985


Asn Asn  Ala Gln Gln Val Ile  Asp Glu Thr Gln Ala  Thr Leu Ser
     5990                5995                6000


Ser Asp  Thr Ile Asn Gln Leu  Ala Asn Ala Val Thr  Gln Ala Lys
     6005                6010                6015


Ser Asn  Leu His Gly Asp Thr  Lys Leu Gln His Asp  Lys Asp Ser
     6020                6025                6030


Ala Lys  Gln Thr Ile Ala Gln  Leu Gln Asn Leu Asn  Ser Ala Gln
     6035                6040                6045


Lys His  Met Glu Asp Ser Leu  Ile Asp Asn Glu Ser  Thr Arg Thr
     6050                6055                6060
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Gln Val Gln His Asp Leu Thr Glu Ala Gln Ala Leu Asp Gly Leu
    6065   6070   6075

Met Gly Ala Leu Lys Glu Ser Ile Lys Asp Tyr Thr Asn Ile Val
    6080   6085   6090

Ser Asn Gly Asn Tyr Ile Asn Ala Glu Pro Ser Lys Lys Gln Ala
    6095   6100   6105

Tyr Asp Ala Ala Val Gln Asn Ala Gln Asn Ile Ile Asn Gly Thr
    6110   6115   6120

Asn Gln Pro Thr Ile Asn Lys Gly Asn Val Thr Thr Ala Thr Gln
    6125   6130   6135

Thr Val Lys Asn Thr Lys Asp Ala Leu Asp Gly Asp His Arg Leu
    6140   6145   6150

Glu Glu Ala Lys Asn Asn Ala Asn Gln Thr Ile Arg Asn Leu Ser
    6155   6160   6165

Asn Leu Asn Asn Ala Gln Lys Asp Ala Glu Lys Asn Leu Val Asn
    6170   6175   6180

Ser Ala Ser Thr Leu Glu Gln Val Gln Gln Asn Leu Gln Thr Ala
    6185   6190   6195

Gln Gln Leu Asp Asn Ala Met Gly Glu Leu Arg Gln Ser Ile Ala
    6200   6205   6210

Lys Lys Asp Gln Val Lys Ala Asp Ser Lys Tyr Leu Asn Glu Asp
    6215   6220   6225

Pro Gln Ile Lys Gln Asn Tyr Asp Asp Ala Val Gln Arg Val Glu
    6230   6235   6240

Thr Ile Ile Asn Glu Thr Gln Asn Pro Glu Leu Leu Lys Ala Asn
    6245   6250   6255

Ile Asp Gln Ala Thr Gln Ser Val Gln Asn Ala Glu Gln Ala Leu
    6260   6265   6270

His Gly Ala Glu Lys Leu Asn Gln Asp Lys Gln Thr Ser Ser Thr
    6275   6280   6285

Glu Leu Asp Gly Leu Thr Asp Leu Thr Asp Ala Gln Arg Glu Lys
    6290   6295   6300

Leu Arg Glu Gln Ile Asn Thr Ser Asn Ser Arg Asp Asp Ile Lys
    6305   6310   6315

Gln Lys Ile Glu Gln Ala Lys Ala Leu Asn Asp Ala Met Lys Lys
    6320   6325   6330

Leu Lys Glu Gln Val Ala Gln Lys Asp Gly Val His Ala Asn Ser
    6335   6340   6345

Asp Tyr Thr Asn Glu Asp Ser Ala Gln Lys Asp Ala Tyr Asn Asn
    6350   6355   6360

Ala Leu Lys Gln Ala Glu Asp Ile Ile Asn Asn Ser Ser Asn Pro
    6365   6370   6375

Asn Leu Asn Ala Gln Asp Ile Thr Asn Ala Leu Asn Asn Ile Lys
    6380   6385   6390

Gln Ala Gln Asp Asn Leu His Gly Ala Gln Lys Leu Gln Gln Asp
    6395   6400   6405

Lys Asn Thr Thr Asn Gln Ala Ile Gly Asn Leu Asn His Leu Asn
    6410   6415   6420

Gln Pro Gln Lys Asp Ala Leu Ile Gln Ala Ile Asn Gly Ala Thr
    6425   6430   6435

Ser Arg Asp Gln Val Ala Glu Lys Leu Lys Glu Ala Glu Ala Leu
    6440   6445   6450

Asp Glu Ala Met Lys Gln Leu Glu Asp Gln Val Asn Gln Asp Asp
    6455   6460   6465

Gln Ile Ser Asn Ser Ser Pro Phe Ile Asn Glu Asp Ser Asp Lys
    6470   6475   6480

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Gln Lys   Thr Tyr Asn Asp Lys   Ile Gln Ala Ala Lys   Glu Ile Ile
    6485                6490                6495

Asn Gln   Thr Ser Asn Pro Thr   Leu Asp Lys Gln Lys   Ile Ala Asp
    6500                6505                6510

Thr Leu   Gln Asn Ile Lys Asp   Ala Val Asn Asn Leu   His Gly Asp
    6515                6520                6525  .

Gln Lys   Leu Ala Gln Ser Lys   Gln Asp Ala Asn Asn   Gln Leu Asn
    6530                6535                6540

His Leu   Asp Asp Leu Thr Glu   Glu Gln Lys Asn His   Phe Lys Pro
    6545                6550                6555

Leu Ile   Asn Asn Ala Asp Thr   Arg Asp Glu Val Asn   Lys Gln Leu
    6560                6565                6570

Glu Ile   Ala Lys Gln Leu Asn   Gly Asp Met Ser Thr   Leu His Lys
    6575                6580                6585

Val Ile   Asn Asp Lys Asp Gln   Ile Gln His Leu Ser   Asn Tyr Ile
    6590                6595                6600

Asn Ala   Asp Asn Asp Lys Lys   Gln Asn Tyr Asp Asn   Ala Ile Lys
    6605                6610                6615

Glu Ala   Glu Asp Leu Ile His   Asn His Pro Asp Thr   Leu Asp His
    6620                6625                6630

Lys Ala   Leu Gln Asp Leu Leu   Asn Lys Ile Asp Gln   Ala His Asn
    6635                6640                6645

Glu Leu   Asn Gly Glu Ser Arg   Phe Lys Gln Ala Leu   Asp Asn Ala
    6650                6655                6660

Leu Asn   Asp Ile Asp Ser Leu   Asn Ser Leu Asn Val   Pro Gln Arg
    6665                6670                6675

Gln Thr   Val Lys Asp Asn Ile   Asn His Val Thr Thr   Leu Glu Ser
    6680                6685                6690

Leu Ala   Gln Glu Leu Gln Lys   Ala Lys Glu Leu Asn   Asp Ala Met
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                6695                    6700                    6705


Lys Ala  Met Arg Asp Ser Ile  Met Asn Gln Glu Gln  Ile Arg Lys
     6710                 6715                 6720


Asn Ser  Asn Tyr Thr Asn Glu  Asp Leu Ala Gln Gln  Asn Ala Tyr
     6725                 6730                 6735


Asn His  Ala Val Asp Lys Ile  Asn Asn Ile Ile Gly  Glu Asp Asn
     6740                 6745                 6750


Ala Thr  Met Asp Pro Gln Ile  Ile Lys Gln Ala Thr  Gln Asp Ile
     6755                 6760                 6765


Asn Thr  Ala Ile Asn Gly Leu  Asn Gly Asp Gln Lys  Leu Gln Asp
     6770                 6775                 6780


Ala Lys  Thr Asp Ala Lys Gln  Gln Ile Thr Asn Phe  Thr Gly Leu
     6785                 6790                 6795


Thr Glu  Pro Gln Lys Gln Ala  Leu Glu Asn Ile Ile  Asn Gln Gln
     6800                 6805                 6810


Thr Ser  Arg Ala Asn Val Ala  Lys Gln Leu Ser His  Ala Lys Phe
     6815                 6820                 6825


Leu Asn  Gly Lys Met Glu Glu  Leu Lys Val Ala Val  Ala Lys Ala
     6830                 6835                 6840


Ser Leu  Val Arg Gln Asn Ser  Asn Tyr Ile Asn Glu  Asp Val Ser
     6845                 6850                 6855


Glu Lys  Glu Ala Tyr Glu Gln  Ala Ile Ala Lys Gly  Gln Glu Ile
     6860                 6865                 6870


Ile Asn  Ser Glu Asn Asn Pro  Thr Ile Ser Ser Thr  Asp Ile Asn
     6875                 6880                 6885


Arg Thr  Ile Gln Glu Ile Asn  Asp Ala Glu Gln Asn  Leu His Gly
     6890                 6895                 6900


Asp Asn  Lys Leu Arg Gln Ala  Gln Glu Ile Ala Lys  Asn Glu Ile
     6905                 6910                 6915
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Gln Asn Leu Asp Gly Leu Asn Ser Ala Gln Ile Thr Lys Leu Ile
    6920   6925   6930

Gln Asp Ile Gly Arg Thr Thr Thr Lys Pro Ala Val Thr Gln Lys
    6935   6940   6945

Leu Glu Glu Ala Lys Ala Ile Asn Gln Ala Met Gln Gln Leu Lys
    6950   6955   6960

Gln Ser Ile Ala Asp Lys Asp Ala Thr Leu Asn Ser Ser Asn Tyr
    6965   6970   6975

Leu Asn Glu Asp Ser Glu Lys Lys Leu Ala Tyr Asp Asn Ala Val
    6980   6985   6990

Ser Gln Ala Glu Gln Leu Ile Asn Gln Leu Asn Asp Pro Thr Met
    6995   7000   7005

Asp Ile Ser Asn Ile Gln Ala Ile Thr Gln Lys Val Ile Gln Ala
    7010   7015   7020

Lys Asp Ser Leu His Gly Ala Asn Lys Leu Ala Gln Asn Gln Ala
    7025   7030   7035

Asp Ser Asn Leu Ile Ile Asn Gln Ser Thr Asn Leu Asn Asp Lys
    7040   7045   7050

Gln Lys Gln Ala Leu Asn Asp Leu Ile Asn His Ala Gln Thr Lys
    7055   7060   7065

Gln Gln Val Ala Glu Ile Ile Ala Gln Ala Asn Lys Leu Asn Asn
    7070   7075   7080

Glu Met Gly Thr Leu Lys Thr Leu Val Glu Glu Gln Ser Asn Val
    7085   7090   7095

His Gln Gln Ser Lys Tyr Ile Asn Glu Asp Pro Gln Val Gln Asn
    7100   7105   7110

Ile Tyr Asn Asp Ser Ile Gln Lys Gly Arg Glu Ile Leu Asn Gly
    7115   7120   7125

Thr Thr Asp Asp Val Leu Asn Asn Asn Lys Ile Ala Asp Ala Ile
    7130   7135   7140

Gln Asn Ile His Leu Thr Lys Asn Asp Leu His Gly Asp Gln Lys
    7145   7150   7155

Leu Gln Lys Ala Gln Gln Asp Ala Thr Asn Glu Leu Asn Tyr Leu
    7160   7165   7170

Thr Asn Leu Asn Asn Ser Gln Arg Gln Ser Glu His Asp Glu Ile
    7175   7180   7185

Asn Ser Ala Pro Ser Arg Thr Glu Val Ser Asn Asp Leu Asn His
    7190   7195   7200

Ala Lys Ala Leu Asn Glu Ala Met Arg Gln Leu Glu Asn Glu Val
    7205   7210   7215

Ala Leu Glu Asn Ser Val Lys Lys Leu Ser Asp Phe Ile Asn Glu
    7220   7225   7230

Asp Glu Ala Ala Gln Asn Glu Tyr Ser Asn Ala Leu Gln Lys Ala
    7235   7240   7245

Lys Asp Ile Ile Asn Gly Val Pro Ser Ser Thr Leu Asp Lys Ala
    7250   7255   7260

Thr Ile Glu Asp Ala Leu Leu Glu Leu Gln Asn Ala Arg Glu Ser
    7265   7270   7275

Leu His Gly Glu Gln Lys Leu Gln Glu Ala Lys Asn Gln Ala Val
    7280   7285   7290

Ala Glu Ile Asp Asn Leu Gln Ala Leu Asn Pro Gly Gln Val Leu
    7295   7300   7305

Ala Glu Lys Thr Leu Val Asn Gln Ala Ser Thr Lys Pro Glu Val
    7310   7315   7320

Gln Glu Ala Leu Gln Lys Ala Lys Glu Leu Asn Glu Ala Met Lys
    7325   7330   7335

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Ala Leu  Lys Thr Glu Ile Asn  Lys Lys Glu Gln Ile  Lys Ala Asp
    7340              7345              7350

Ser Arg  Tyr Val Asn Ala Asp  Ser Gly Leu Gln Ala  Asn Tyr Asn
    7355              7360              7365

Ser Ala  Leu Asn Tyr Gly Ser  Gln Ile Ile Ala Thr  Thr Gln Pro
    7370              7375              7380

Pro Glu  Leu Asn Lys Asp Val  Ile Asn Arg Ala Thr  Gln Thr Ile
    7385              7390              7395

Lys Thr  Ala Glu Asn Asn Leu  Asn Gly Gln Ser Lys  Leu Ala Glu
    7400              7405              7410

Ala Lys  Ser Asp Gly Asn Gln  Ser Ile Glu His Leu  Gln Gly Leu
    7415              7420              7425

Thr Gln  Ser Gln Lys Asp Lys  Gln His Asp Leu Ile  Asn Gln Ala
    7430              7435              7440

Gln Thr  Lys Gln Gln Val Asp  Asp Ile Val Asn Asn  Ser Lys Gln
    7445              7450              7455

Leu Asp  Asn Ser Met Asn Gln  Leu Gln Gln Ile Val  Asn Asn Asp
    7460              7465              7470

Asn Thr  Val Lys Gln Asn Ser  Asp Phe Ile Asn Glu  Asp Ser Ser
    7475              7480              7485

Gln Gln  Asp Ala Tyr Asn His  Ala Ile Gln Ala Ala  Lys Asp Leu
    7490              7495              7500

Ile Thr  Ala His Pro Thr Ile  Met Asp Lys Asn Gln  Ile Asp Gln
    7505              7510              7515

Ala Ile  Glu Asn Ile Lys Gln  Ala Leu Asn Asp Leu  His Gly Ser
    7520              7525              7530

Asn Lys  Leu Ser Glu Asp Lys  Lys Glu Ala Ser Glu  Gln Leu Gln
    7535              7540              7545

Asn Leu  Asn Ser Leu Thr Asn  Gly Gln Lys Asp Thr  Ile Leu Asn
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        7550                    7555                    7560

His Ile  Phe Ser Ala Pro Thr  Arg Ser Gln Val Gly  Glu Lys Ile
        7565                    7570                    7575


Ala Ser  Ala Lys Gln Leu Asn  Asn Thr Met Lys Ala  Leu Arg Asp
        7580                    7585                    7590


Ser Ile  Ala Asp Asn Asn Glu  Ile Leu Gln Ser Ser  Lys Tyr Phe
        7595                    7600                    7605


Asn Glu  Asp Ser Glu Gln Gln  Asn Ala Tyr Asn Gln  Ala Val Asn
        7610                    7615                    7620


Lys Ala  Lys Asn Ile Ile Asn  Asp Gln Pro Thr Pro  Val Met Ala
        7625                    7630                    7635


Asn Asp  Glu Ile Gln Ser Val  Leu Asn Glu Val Lys  Gln Thr Lys
        7640                    7645                    7650


Asp Asn  Leu His Gly Asp Gln  Lys Leu Ala Asn Asp  Lys Thr Asp
        7655                    7660                    7665


Ala Gln  Ala Thr Leu Asn Ala  Leu Asn Tyr Leu Asn  Gln Ala Gln
        7670                    7675                    7680


Arg Gly  Asn Leu Glu Thr Lys  Val Gln Asn Ser Asn  Ser Arg Pro
        7685                    7690                    7695


Glu Val  Gln Lys Val Val Gln  Leu Ala Asn Gln Leu  Asn Asp Ala
        7700                    7705                    7710


Met Lys  Lys Leu Asp Asp Ala  Leu Thr Gly Asn Asp  Ala Ile Lys
        7715                    7720                    7725


Gln Thr  Ser Asn Tyr Ile Asn  Glu Asp Thr Ser Gln  Gln Val Asn
        7730                    7735                    7740


Phe Asp  Glu Tyr Thr Asp Arg  Gly Lys Asn Ile Val  Ala Glu Gln
        7745                    7750                    7755


Thr Asn  Pro Asn Met Ser Pro  Thr Asn Ile Asn Thr  Ile Ala Asp
        7760                    7765                    7770
```

Lys Ile Thr Glu Ala Lys Asn Asp Leu His Gly Val Gln Lys Leu
    7775   7780   7785

Lys Gln Ala Gln Gln Gln Ser Ile Asn Thr Ile Asn Gln Met Thr
    7790   7795   7800

Gly Leu Asn Gln Ala Gln Lys Glu Gln Leu Asn Gln Glu Ile Gln
    7805   7810   7815

Gln Thr Gln Thr Arg Ser Glu Val His Gln Val Ile Asn Lys Ala
    7820   7825   7830

Gln Ala Leu Asn Asp Ser Met Asn Thr Leu Arg Gln Ser Ile Thr
    7835   7840   7845

Asp Glu His Glu Val Lys Gln Thr Ser Asn Tyr Ile Asn Glu Thr
    7850   7855   7860

Val Gly Asn Gln Thr Ala Tyr Asn Asn Ala Val Asp Arg Val Lys
    7865   7870   7875

Gln Ile Ile Asn Gln Thr Ser Asn Pro Thr Met Asn Pro Leu Glu
    7880   7885   7890

Val Glu Arg Ala Thr Ser Asn Val Lys Ile Ser Lys Asp Ala Leu
    7895   7900   7905

His Gly Glu Arg Glu Leu Asn Asp Asn Lys Asn Ser Lys Thr Phe
    7910   7915   7920

Ala Val Asn His Leu Asp Asn Leu Asn Gln Ala Gln Lys Glu Ala
    7925   7930   7935

Leu Thr His Glu Ile Glu Gln Ala Thr Ile Val Ser Gln Val Asn
    7940   7945   7950

Asn Ile Tyr Asn Lys Ala Lys Ala Leu Asn Asn Asp Met Lys Lys
    7955   7960   7965

Leu Lys Asp Ile Val Ala Gln Gln Asp Asn Val Arg Gln Ser Asn
    7970   7975   7980

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Asn Tyr  Ile Asn Glu Asp Ser  Thr Pro Gln Asn Met  Tyr Asn Asp
    7985              7990              7995

Thr Ile  Asn His Ala Gln Ser  Ile Ile Asp Gln Val  Ala Asn Pro
    8000              8005              8010

Thr Met  Ser His Asp Glu Ile  Glu Asn Ala Ile Asn  Asn Ile Lys
    8015              8020              8025

His Ala  Ile Asn Ala Leu Asp  Gly Glu His Lys Leu  Gln Gln Ala
    8030              8035              8040

Lys Glu  Asn Ala Asn Leu Leu  Ile Asn Ser Leu Asn  Asp Leu Asn
    8045              8050              8055

Ala Pro  Gln Arg Asp Ala Ile  Asn Arg Leu Val Asn  Glu Ala Gln
    8060              8065              8070

Thr Arg  Glu Lys Val Ala Glu  Gln Leu Gln Ser Ala  Gln Ala Leu
    8075              8080              8085

Asn Asp  Ala Met Lys His Leu  Arg Asn Ser Ile Gln  Asn Gln Ser
    8090              8095              8100

Ser Val  Arg Gln Glu Ser Lys  Tyr Ile Asn Ala Ser  Asp Ala Lys
    8105              8110              8115

Lys Glu  Gln Tyr Asn His Ala  Val Arg Glu Val Glu  Asn Ile Ile
    8120              8125              8130

Asn Glu  Gln His Pro Thr Leu  Asp Lys Glu Ile Ile  Lys Gln Leu
    8135              8140              8145

Thr Asp  Gly Val Asn Gln Ala  Asn Asn Asp Leu Asn  Gly Val Glu
    8150              8155              8160

Leu Leu  Asp Ala Asp Lys Gln  Asn Ala His Gln Ser  Ile Pro Thr
    8165              8170              8175

Leu Met  His Leu Asn Gln Ala  Gln Gln Asn Ala Leu  Asn Glu Lys
    8180              8185              8190
```

Ile Asn   Asn Ala Val Thr Arg   Thr Glu Val Ala Ala   Ile Ile Gly
    8195   8200   8205

Gln Ala   Lys Leu Leu Asp His   Ala Met Glu Asn Leu   Glu Glu Ser
    8210   8215   8220

Ile Lys   Asp Lys Glu Gln Val   Lys Gln Ser Ser Asn   Tyr Ile Asn
    8225   8230   8235

Glu Asp   Ser Asp Val Gln Glu   Thr Tyr Asp Asn Ala   Val Asp His
    8240   8245   8250

Val Thr   Glu Ile Leu Asn Gln   Thr Val Asn Pro Thr   Leu Ser Ile
    8255   8260   8265

Glu Asp   Ile Glu His Ala Ile   Asn Glu Val Asn Gln   Ala Lys Lys
    8270   8275   8280

Gln Leu   Arg Gly Lys Gln Lys   Leu Tyr Gln Thr Ile   Asp Leu Ala
    8285   8290   8295

Asp Lys   Glu Leu Ser Lys Leu   Asp Asp Leu Thr Ser   Gln Gln Ser
    8300   8305   8310

Ser Ser   Ile Ser Asn Gln Ile   Tyr Thr Ala Lys Thr   Arg Thr Glu
    8315   8320   8325

Val Ala   Gln Ala Ile Glu Lys   Ala Lys Ser Leu Asn   His Ala Met
    8330   8335   8340

Lys Ala   Leu Asn Lys Val Tyr   Lys Asn Ala Asp Lys   Val Leu Asp
    8345   8350   8355

Ser Ser   Arg Phe Ile Asn Glu   Asp Gln Pro Glu Lys   Lys Ala Tyr
    8360   8365   8370

Gln Gln   Ala Ile Asn His Val   Asp Ser Ile Ile His   Arg Gln Thr
    8375   8380   8385

Asn Pro   Glu Met Asp Pro Thr   Val Ile Asn Ser Ile   Thr His Glu
    8390   8395   8400

Leu Glu   Thr Ala Gln Asn Asn   Leu His Gly Asp Gln   Lys Leu Ala

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        8405                    8410                    8415

His Ala  Gln Gln Asp Ala Ala  Asn Val Ile Asn Gly  Leu Ile His
    8420                    8425                    8430


Leu Asn  Val Ala Gln Arg Glu  Val Met Ile Asn Thr  Asn Thr Asn
    8435                    8440                    8445


Ala Thr  Thr Arg Glu Lys Val  Ala Lys Asn Leu Asp  Asn Ala Gln
    8450                    8455                    8460


Ala Leu  Asp Lys Ala Met Glu  Thr Leu Gln Gln Val  Val Ala His
    8465                    8470                    8475


Lys Asn  Asn Ile Leu Asn Asp  Ser Lys Tyr Leu Asn  Glu Asp Ser
    8480                    8485                    8490


Lys Tyr  Gln Gln Gln Tyr Asp  Arg Val Ile Ala Asp  Ala Glu Gln
    8495                    8500                    8505


Leu Leu  Asn Gln Thr Thr Asn  Pro Thr Leu Glu Pro  Tyr Lys Val
    8510                    8515                    8520


Asp Ile  Val Lys Asp Asn Val  Leu Ala Asn Glu Lys  Ile Leu Phe
    8525                    8530                    8535


Gly Ala  Glu Lys Leu Ser Tyr  Asp Lys Ser Asn Ala  Asn Asp Glu
    8540                    8545                    8550


Ile Lys  His Met Asn Tyr Leu  Asn Asn Ala Gln Lys  Gln Ser Ile
    8555                    8560                    8565


Lys Asp  Met Ile Ser His Ala  Ala Leu Arg Thr Glu  Val Lys Gln
    8570                    8575                    8580


Leu Leu  Gln Gln Ala Lys Ile  Leu Asp Glu Ala Met  Lys Ser Leu
    8585                    8590                    8595


Glu Asp  Lys Thr Gln Val Val  Ile Thr Asp Thr Thr  Leu Pro Asn
    8600                    8605                    8610


Tyr Thr  Glu Ala Ser Glu Asp  Lys Lys Glu Lys Val  Asp Gln Thr
    8615                    8620                    8625
```

Val Ser His Ala Gln Ala Ile Ile Asp Lys Ile Asn Gly Ser Asn
    8630   8635   8640

Val Ser Leu Asp Gln Val Arg Gln Ala Leu Glu Gln Leu Thr Gln
    8645   8650   8655

Ala Ser Glu Asn Leu Asp Gly Asp Gln Arg Val Glu Glu Ala Lys
    8660   8665   8670

Val His Ala Asn Gln Thr Ile Asp Gln Leu Thr His Leu Asn Ser
    8675   8680   8685

Leu Gln Gln Gln Thr Ala Lys Glu Ser Val Lys Asn Ala Thr Lys
    8690   8695   8700

Leu Glu Glu Ile Ala Thr Val Ser Asn Asn Ala Gln Ala Leu Asn
    8705   8710   8715

Lys Val Met Gly Lys Leu Glu Gln Phe Ile Asn His Ala Asp Ser
    8720   8725   8730

Val Glu Asn Ser Asp Asn Tyr Arg Gln Ala Asp Asp Asp Lys Ile
    8735   8740   8745

Ile Ala Tyr Asp Glu Ala Leu Glu His Gly Gln Asp Ile Gln Lys
    8750   8755   8760

Thr Asn Ala Thr Gln Asn Glu Thr Lys Gln Ala Leu Gln Gln Leu
    8765   8770   8775

Ile Tyr Ala Glu Thr Ser Leu Asn Gly Phe Glu Arg Leu Asn His
    8780   8785   8790

Ala Arg Pro Arg Ala Leu Glu Tyr Ile Lys Ser Leu Glu Lys Ile
    8795   8800   8805

Asn Asn Ala Gln Lys Ser Ala Leu Glu Asp Lys Val Thr Gln Ser
    8810   8815   8820

His Asp Leu Leu Glu Leu Glu His Ile Val Asn Glu Gly Thr Asn
    8825   8830   8835

Leu Asn Asp Ile Met Gly Glu Leu Ala Asn Ala Ile Val Asn Asn
    8840   8845   8850

Tyr Ala Pro Thr Lys Ala Ser Ile Asn Tyr Ile Asn Ala Asp Asn
    8855   8860   8865

Leu Arg Lys Asp Asn Phe Thr Gln Ala Ile Asn Asn Ala Arg Asp
    8870   8875   8880

Ala Leu Asn Lys Thr Gln Gly Gln Asn Leu Asp Phe Asn Ala Ile
    8885   8890   8895

Asp Thr Phe Lys Asp Asp Ile Phe Lys Thr Lys Asp Ala Leu Asn
    8900   8905   8910

Gly Ile Glu Arg Leu Thr Ala Ala Lys Ser Lys Ala Glu Lys Leu
    8915   8920   8925

Ile Asp Ser Leu Lys Phe Ile Asn Lys Ala Gln Phe Thr His Ala
    8930   8935   8940

Asn Asp Glu Ile Ile Asn Thr Asn Ser Ile Ala Gln Leu Ser Arg
    8945   8950   8955

Ile Val Asn Gln Ala Phe Asp Leu Asn Asp Ala Met Lys Ser Leu
    8960   8965   8970

Arg Asp Glu Leu Asn Asn Gln Ala Phe Pro Val Gln Ala Ser Ser
    8975   8980   8985

Asn Tyr Ile Asn Ser Asp Glu Asp Leu Lys Gln Gln Phe Asp His
    8990   8995   9000

Ala Leu Ser Asn Ala Arg Lys Val Leu Ala Lys Glu Asn Gly Lys
    9005   9010   9015

Asn Leu Asp Glu Lys Gln Ile Gln Gly Leu Lys Gln Val Ile Glu
    9020   9025   9030

Asp Thr Lys Asp Ala Leu Asn Gly Ile Gln Arg Leu Ser Lys Ala
    9035   9040   9045

Lys Ala Lys Ala Ile Gln Tyr Val Gln Ser Leu Ser Tyr Ile Asn
    9050   9055   9060

Asp Ala Gln Arg His Ile Ala Glu Asn Asn Ile His Asn Ser Asp
    9065   9070   9075

Asp Leu Ser Ser Leu Ala Asn Thr Leu Ser Lys Ala Ser Asp Leu
    9080   9085   9090

Asp Asn Ala Met Lys Asp Leu Arg Asp Thr Ile Glu Ser Asn Ser
    9095   9100   9105

Thr Ser Val Pro Asn Ser Val Asn Tyr Ile Asn Ala Asp Lys Asn
    9110   9115   9120

Leu Gln Ile Glu Phe Asp Glu Ala Leu Gln Gln Ala Ser Ala Thr
    9125   9130   9135

Ser Ser Lys Thr Ser Glu Asn Pro Ala Thr Ile Glu Glu Val Leu
    9140   9145   9150

Gly Leu Ser Gln Ala Ile Tyr Asp Thr Lys Asn Ala Leu Asn Gly
    9155   9160   9165

Glu Gln Arg Leu Ala Thr Glu Lys Ser Lys Asp Leu Lys Leu Ile
    9170   9175   9180

Lys Gly Leu Lys Asp Leu Asn Lys Ala Gln Leu Glu Asp Val Thr
    9185   9190   9195

Asn Lys Val Asn Ser Ala Asn Thr Leu Thr Glu Leu Ser Gln Leu
    9200   9205   9210

Thr Gln Ser Thr Leu Glu Leu Asn Asp Lys Met Lys Leu Leu Arg
    9215   9220   9225

Asp Lys Leu Lys Thr Leu Val Asn Pro Val Lys Ala Ser Leu Asn
    9230   9235   9240

Tyr Arg Asn Ala Asp Tyr Asn Leu Lys Arg Gln Phe Asn Lys Ala
    9245   9250   9255

Leu Lys Glu Ala Lys Gly Val Leu Asn Lys Asn Ser Gly Thr Asn

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        9260                    9265                    9270


Val Asn  Ile Asn Asp Ile Gln  His Leu Leu Thr Gln  Ile Asp Asn
    9275                    9280                    9285


Ala Lys  Asp Gln Leu Asn Gly  Glu Arg Arg Leu Lys  Glu His Gln
    9290                    9295                    9300


Gln Lys  Ser Glu Val Phe Ile  Ile Lys Glu Leu Asp  Ile Leu Asn
    9305                    9310                    9315


Asn Ala  Gln Lys Ala Ala Ile  Ile Asn Gln Ile Arg  Ala Ser Lys
    9320                    9325                    9330


Asp Ile  Lys Ile Ile Asn Gln  Ile Val Asp Asn Ala  Ile Glu Leu
    9335                    9340                    9345


Asn Asp  Ala Met Gln Gly Leu  Lys Glu His Val Ala  Gln Leu Thr
    9350                    9355                    9360


Ala Thr  Thr Lys Asp Asn Ile  Glu Tyr Leu Asn Ala  Asp Glu Asp
    9365                    9370                    9375


His Lys  Leu Gln Tyr Asp Tyr  Ala Ile Asn Leu Ala  Asn Asn Val
    9380                    9385                    9390


Leu Asp  Lys Glu Asn Gly Thr  Asn Lys Asp Ala Asn  Ile Ile Ile
    9395                    9400                    9405


Gly Met  Ile Gln Asn Met Asp  Asp Ala Arg Ala Leu  Leu Asn Gly
    9410                    9415                    9420


Ile Glu  Arg Leu Lys Asp Ala  Gln Thr Lys Ala His  Asn Asp Ile
    9425                    9430                    9435


Lys Asp  Thr Leu Lys Arg Gln  Leu Asp Glu Ile Glu  His Ala Asn
    9440                    9445                    9450


Ala Thr  Ser Asn Ser Lys Ala  Gln Ala Lys Gln Met  Val Asn Glu
    9455                    9460                    9465


Glu Ala  Arg Lys Ala Leu Ser  Asn Ile Asn Asp Ala  Thr Ser Asn
    9470                    9475                    9480
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Asp Leu Val Asn Gln Ala Lys Asp Glu Gly Gln Ser Ala Ile Glu
    9485   9490   9495

His Ile His Ala Asp Glu Leu Pro Lys Ala Lys Leu Asp Ala Asn
    9500   9505   9510

Gln Met Ile Asp Gln Lys Val Glu Asp Ile Asn His Leu Ile Ser
    9515   9520   9525

Gln Asn Pro Asn Leu Ser Asn Glu Glu Lys Asn Lys Leu Ile Ser
    9530   9535   9540

Gln Ile Asn Lys Leu Val Asn Gly Ile Lys Asn Glu Ile Gln Gln
    9545   9550   9555

Ala Ile Asn Lys Gln Gln Ile Glu Asn Ala Thr Thr Lys Leu Asp
    9560   9565   9570

Glu Val Ile Glu Thr Thr Lys Lys Leu Ile Ile Ala Lys Ala Glu
    9575   9580   9585

Ala Lys Gln Met Ile Lys Glu Leu Ser Gln Lys Lys Arg Asp Ala
    9590   9595   9600

Ile Asn Asn Asn Thr Asp Leu Thr Pro Ser Gln Lys Ala His Ala
    9605   9610   9615

Leu Ala Asp Ile Asp Lys Thr Glu Lys Asp Ala Leu Gln His Ile
    9620   9625   9630

Glu Asn Ser Asn Ser Ile Asp Asp Ile Asn Asn Asn Lys Glu His
    9635   9640   9645

Ala Phe Asn Thr Leu Ala His Ile Ile Ile Trp Asp Thr Asp Gln
    9650   9655   9660

Gln Pro Leu Val Phe Glu Leu Pro Glu Leu Ser Leu Gln Asn Ala
    9665   9670   9675

Leu Val Thr Ser Glu Val Val Val His Arg Asp Glu Thr Ile Ser
    9680   9685   9690

```
Leu Glu   Ser Ile Ile Gly Ala   Met Thr Leu Thr Asp   Glu Leu Lys
    9695                  9700                9705

Val Asn   Ile Val Ser Leu Pro   Asn Thr Asp Lys Val   Ala Asp His
    9710                  9715                9720

Leu Thr   Ala Lys Val Lys Val   Ile Leu Ala Asp Gly   Ser Tyr Val
    9725                  9730                9735

Thr Val   Asn Val Pro Val Lys   Val Val Glu Lys Glu   Leu Gln Ile
    9740                  9745             9750

Ala Lys   Lys Asp Ala Ile Lys   Thr Ile Asp Val Leu   Val Lys Gln
    9755                  9760             .9765

Lys Ile   Lys Asp Ile Asp Ser   Asn Asn Glu Leu Thr   Ser Thr Gln
    9770                  9775                9780

Arg Glu   Asp Ala Lys Ala Glu   Ile Glu Arg Leu Lys   Lys Gln Ala
    9785                  9790                9795

Ile Asp   Lys Val Asn His Ser   Lys Ser Ile Lys Asp   Ile Glu Thr
    9800                  9805                9810

Val Lys   Arg Thr Asp Phe Glu   Glu Ile Asp Gln Phe   Asp Pro Lys
    9815                  9820                9825

Arg Phe   Thr Leu Asn Lys Ala   Lys Lys Asp Ile Ile   Thr Asp Val
    9830                  9835                9840

Asn Thr   Gln Ile Gln Asn Gly   Phe Lys Glu Ile Glu   Thr Ile Lys
    9845                  9850                9855

Gly Leu   Thr Ser Asn Glu Lys   Thr Gln Phe Asp Lys   Gln Leu Thr
    9860                  9865                9870

Ala Leu   Gln Lys Glu Phe Leu   Glu Lys Val Glu His   Ala His Asn
    9875                  9880                9885

Leu Val   Glu Leu Asn Gln Leu   Gln Gln Glu Phe Asn   Asn Arg Tyr
    9890                  9895                9900
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Lys His Ile Leu Asn Gln Ala His Leu Leu Gly Glu Lys His Ile
    9905   9910   9915

Ala Glu His Lys Leu Gly Tyr Val Val Val Asn Lys Thr Gln Gln
    9920   9925   9930

Ile Leu Asn Asn Gln Ser Ala Ser Tyr Phe Ile Lys Gln Trp Ala
    9935   9940   9945

Leu Asp Arg Ile Lys Gln Ile Gln Leu Glu Thr Met Asn Ser Ile
    9950   9955   9960

Arg Gly Ala His Thr Val Gln Asp Val His Lys Ala Leu Leu Gln
    9965   9970   9975

Gly Ile Glu Gln Ile Leu Lys Val Asn Val Ser Ile Ile Asn Gln
    9980   9985   9990

Ser Phe Asn Asp Ser Leu His Asn Phe Asn Tyr Leu His Ser Lys
    9995   10000   10005

Phe Asp Ala Arg Leu Arg Glu Lys Asp Val Ala Asn His Ile Val
    10010   10015   10020

Gln Thr Glu Thr Phe Lys Glu Val Leu Lys Gly Thr Gly Val Glu
    10025   10030   10035

Pro Gly Lys Ile Asn Lys Glu Thr Gln Gln Pro Lys Leu His Lys
    10040   10045   10050

Asn Asp Asn Asp Ser Leu Phe Lys His Leu Val Asp Asn Phe Gly
    10055   10060   10065

Lys Thr Val Gly Val Ile Thr Leu Thr Gly Leu Leu Ser Ser Phe
    10070   10075   10080

Trp Leu Val Leu Ala Lys Arg Arg Lys Lys Glu Glu Glu Glu Lys
    10085   10090   10095

Gln Ser Ile Lys Asn His His Lys Asp Ile Arg Leu Ser Asp Thr
    10100   10105   10110

Asp Lys Ile Asp Pro Ile Val Ile Thr Lys Arg Lys Ile Asp Lys

10115   10120   10125

Glu Glu   Gln Ile Gln Asn Asp   Asp Lys His Ser Ile   Pro Val Ala
    10130   10135   10140

Lys His   Lys Lys Ser Lys Glu   Lys Gln Leu Ser Glu   Glu Asp Ile
    10145   10150   10155   .

His Ser   Ile Pro Val Val Lys   Arg Lys Gln Asn Ser   Asp Asn Lys
    10160   10165   10170

Asp Thr   Lys Gln Lys Lys Val   Thr Ser Lys Lys Lys   Lys Thr Pro
    10175   10180   10185

Gln Ser   Thr Lys Lys Val Val   Lys Thr Lys Lys Arg   Ser Lys Lys
    10190   10195   10200

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<400> 24

Met Lys Glu Asn Lys Arg Lys Asn Asn Leu Asp Lys Asn Asn Thr Arg
1   5   10   15

Phe Ser Ile Arg Lys Tyr Gln Gly Tyr Gly Ala Thr Ser Val Ala Ile
            20   25   30

Ile Gly Phe Ile Ile Ile Ser Cys Phe Ser Glu Ala Lys Ala Asp Ser
        35   40   45

Asp Lys His Glu Ile Lys Ser His Gln Gln Ser Met Thr Asn His Leu
    50   55   60

Thr Thr Leu Pro Ser Asp Asn Gln Glu Asn Thr Ser Asn Asn Glu Phe
65   70   75   80

Asn Asn Arg Asn His Asp Ile Ser His Leu Ser Leu Asn Lys Ser Ile
            85   90   95

Gln Met Asp Glu Leu Lys Lys Leu Ile Lys Gln Tyr Lys Ala Ile Asn
            100   105   110

Leu Asn Asp Lys Thr Glu Glu Ser Ile Lys Leu Phe Gln Ser Asp Leu
        115   120   125

Val Gln Ala Glu Ser Leu Ile Asn Asn Pro Gln Ser Gln Gln His Val
        130   135   140

Asp Ala Phe Tyr His Lys Phe Leu Asn Ser Ala Gly Lys Leu Arg Lys
145   150   155   160

Lys Glu Thr Val Ser Ile Lys His Glu Arg Ser Glu Ser Asn Thr Tyr
                165   170   175

Arg Leu Gly Asp Glu Val Arg Ser Gln Thr Phe Ser His Ile Arg His
                180   185   190

Lys Arg Asn Ala Val Ser Phe Arg Asn Ala Asp Gln Ser Asn Leu Ser
                195   200   205

Thr Asp Pro Leu Lys Ala Asn Glu Ile Asn Pro Glu Ile Gln Asn Gly
        210   215   220

Asn Phe Ser Gln Val Ser Gly Gly Pro Leu Pro Thr Ser Ser Lys Arg
225   230   235   240

Leu Thr Val Val Thr Asn Val Asp Asn Trp His Ser Tyr Ser Thr Asp
                245   250   255

Pro Asn Pro Glu Tyr Pro Met Phe Tyr Thr Thr Thr Ala Val Asn Tyr
                260   265   270

Pro Asn Phe Met Ser Asn Gly Asn Ala Pro Tyr Gly Val Ile Leu Gly
        275   280   285

Arg Thr Thr Asp Gly Trp Asn Arg Asn Val Ile Asp Ser Lys Val Ala
        290   295   300

Gly Ile Tyr Gln Asp Ile Asp Val Val Pro Gly Ser Glu Leu Asn Val
305   310   315   320

Asn Phe Ile Ser Thr Ser Pro Val Phe Ser Asp Gly Ala Ala Gly Ala
                325   330   335

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Lys Leu Lys Ile Ser Asn Val Glu Gln Asn Arg Val Leu Phe Asp Ser
        340                 345                 350

Arg Leu Asn Gly Met Gly Pro Tyr Pro Thr Gly Lys Leu Ser Ala Met
        355                 360                 365

Val Asn Ile Pro Asn Asp Ile Asn Arg Val Arg Ile Ser Phe Leu Pro
    370                 375                 380

Val Ser Ser Thr Gly Arg Val Ser Val Gln Arg Ser Ser Arg Glu His
385                 390                 395                 400

Gly Phe Gly Asp Asn Ser Ser Tyr Tyr His Gly Gly Ser Val Ser Asp
            405                 410                 415

Val Arg Ile Asn Ser Gly Ser Tyr Val Val Ser Lys Val Thr Gln Arg
        420                 425                 430

Glu Tyr Thr Thr Arg Pro Asn Ser Ser Asn Asp Thr Phe Ala Arg Ala
        435                 440                 445

Thr Ile Asn Leu Ser Val Glu Asn Lys Gly His Asn Gln Ser Lys Asp
    450                 455                 460

Thr Tyr Tyr Glu Val Ile Leu Pro Gln Asn Ser Arg Leu Ile Ser Thr
465                 470                 475                 480

Arg Gly Gly Ser Gly Asn Tyr Asn Asn Ala Thr Asn Lys Leu Ser Ile
            485                 490                 495

Arg Leu Asp Asn Leu Asn Pro Gly Asp Arg Arg Asp Ile Ser Tyr Thr
        500                 505                 510

Val Asp Phe Glu Ser Ser Ser Pro Lys Leu Ile Asn Leu Asn Ala His
        515                 520                 525

Leu Leu Tyr Lys Thr Asn Ala Thr Phe Arg Gly Asn Asp Gly Gln Arg
    530                 535                 540

Thr Gly Asp Asn Ile Val Asp Leu Gln Ser Ile Ala Leu Leu Met Asn
545                 550                 555                 560

Lys Asp Val Leu Glu Thr Glu Leu Asn Glu Ile Asp Lys Phe Ile Arg
```

Asp Leu Asn Glu Ala Asp Phe Thr Ile Asp Ser Trp Ser Ala Leu Gln
        580   585   590

Glu Lys Met Thr Glu Gly Gly Asn Ile Leu Asn Glu Gln Gln Asn Gln
        595   600   605

Val Ala Leu Glu Asn Gln Ala Ser Gln Glu Thr Ile Asn Asn Val Thr
        610   615   620

Gln Ser Leu Glu Ile Leu Lys Asn Asn Leu Lys Tyr Lys Thr Pro Ser
625   630   635   640

Gln Pro Ile Ile Lys Ser Asn Asn Gln Ile Pro Asn Ile Thr Ile Ser
                645   650   655

Pro Ala Asp Lys Ala Asp Lys Leu Thr Ile Thr Tyr Gln Asn Thr Asp
        660   665   670

Asn Glu Ser Ala Ser Ile Ile Gly Asn Lys Leu Asn Asn Gln Trp Ser
        675   680   685

Leu Asn Asn Asn Ile Pro Gly Ile Glu Ile Asp Met Gln Thr Gly Leu
        690   695   700

Val Thr Ile Asp Tyr Lys Ala Val Tyr Pro Glu Ser Val Val Gly Ala
705   710   715   720

Asn Asp Lys Thr Gly Asn Ser Asp Ala Ser Ala Glu Ser Arg Ile Thr
                725   730   735

Met Pro Arg Lys Glu Ala Thr Pro Leu Ser Pro Ile Val Glu Ala Asn
        740   745   750

Glu Glu Arg Val Asn Val Val Ile Ala Pro Asn Gly Glu Ala Thr Gln
        755   760   765

Ile Ala Ile Lys Tyr Arg Thr Pro Asp Gly Gln Glu Ala Thr Leu Val
        770   775   780

Ala Ser Lys Asn Gly Ser Ser Trp Thr Leu Asn Lys Gln Ile Asp Tyr
785   790   795   800

Val Asn Ile Glu Glu Asn Ser Gly Lys Val Thr Ile Gly Tyr Gln Ala
                805   810   815

Val Gln Pro Glu Ser Glu Val Ile Ala Thr Glu Thr Lys Gly Asn Ser
                820   825   830

Asp Glu Ser Ala Glu Ser Arg Val Thr Met Pro Arg Lys Glu Ala Thr
                835   840   845

Pro His Ser Pro Ile Val Glu Ala Asn Glu Glu His Val Asn Val Thr
        850   855   860

Ile Ala Pro Asn Gly Glu Ala Thr Gln Ile Ala Ile Lys Tyr Arg Thr
865   870   875   880

Pro Asp Gly Gln Glu Thr Thr Leu Ile Ala Ser Lys Asn Gly Ser Ser
                885   890   895

Trp Thr Leu Asn Lys Gln Ile Asp Tyr Val Asn Ile Glu Glu Asn Ser
                900   905   910

Gly Lys Val Thr Ile Gly Tyr Gln Ala Val Gln Leu Glu Ser Glu Val
        915   920   925

Ile Ala Thr Glu Thr Lys Gly Asn Ser Asp Ala Ser Ala Glu Ser Arg
        930   935   940

Ile Thr Met Leu Arg Lys Glu Ala Thr Pro His Ser Pro Ile Val Glu
945   950   955   960

Ala Asn Glu Glu His Val Asn Val Thr Ile Ala Pro Asn Gly Glu Ala
                965   970   975

Thr Gln Ile Ala Ile Lys Tyr Arg Thr Pro Asp Gly Gln Glu Ala Thr
                980   985   990

Leu Val Ala Ser Lys Asn Glu Ser Ser Trp Thr Leu Asn Lys Gln Ile
        995   1000   1005

Asp His Val Asn Ile Asp Glu Asn Ser Gly Lys Val Thr Ile Gly
        1010   1015   1020

Tyr Gln Ala Val Gln Pro Glu Ser Glu Ile Ile Ala Thr Glu Thr
    1025   1030   1035

Lys Gly Asn Ser Asp Ala Ser Ala Glu Ser Arg Ile Thr Met Pro
    1040   1045   1050

Arg Lys Glu Ala Thr Pro Ile Pro Pro Thr Leu Glu Ala Ser Val
    1055   1060   1065

Gln Glu Ala Ser Val Thr Val Thr Pro Asn Glu Asn Ala Thr Lys
    1070   1075   1080

Val Phe Ile Lys Tyr Leu Asp Ile Asn Asp Glu Ile Ser Thr Ile
    1085   1090   1095

Ile Ala Ser Lys Ile Asn Gln Gln Trp Thr Leu Asn Lys Asp Asn
    1100   1105   1110

Phe Gly Ile Lys Ile Asn Pro Leu Thr Gly Lys Val Ile Ile Ser
    1115   1120   1125

Tyr Val Ala Val Gln Pro Glu Ser Asp Val Ile Ala Ile Glu Ser
    1130   1135   1140

Gln Gly Asn Ser Asp Leu Ser Glu Glu Ser Arg Ile Ile Met Pro
    1145   1150   1155

Thr Lys Glu Glu Pro Pro Glu Pro Pro Ile Leu Glu Ser Asp Ser
    1160   1165   1170

Ile Glu Ala Lys Val Asn Ile Phe Pro Asn Asp Glu Ala Thr Arg
    1175   1180   1185

Ile Val Ile Met Tyr Thr Ser Leu Glu Gly Gln Glu Ala Thr Leu
    1190   1195   1200

Val Ala Ser Lys Asn Glu Ser Ser Trp Thr Leu Asn Lys Gln Ile
    1205   1210   1215

Asp His Val Asn Ile Asp Glu Asn Ser Gly Lys Val Thr Ile Gly
    1220   1225   1230

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Tyr Gln  Ala Val Gln Pro Glu  Ser Glu Val Ile Ala  Thr Glu Thr
    1235             1240              1245

Lys Gly  Asn Ser Asp Ala Ser  Ala Glu Ser Arg Val  Thr Met Pro
    1250             1255              1260

Arg Lys  Glu Ala Thr Pro His  Ser Pro Ile Val Glu  Thr Asn Glu
    1265             1270              1275

Glu Arg  Val Asn Val Val Ile  Ala Pro Asn Gly Glu  Ala Thr Gln
    1280             1285              1290

Ile Ala  Ile Lys Tyr Arg Thr  Pro Asp Gly Gln Glu  Thr Thr Leu
    1295             1300              1305

Ile Ala  Ser Lys Asn Gly Ser  Ser Trp Thr Leu Asn  Lys Gln Ile
    1310             1315              1320

Asp His  Val Asn Ile Asp Glu  Asn Ser Gly Lys Val  Thr Ile Gly
    1325             1330              1335

Tyr Gln  Ala Val Gln Pro Glu  Ser Glu Ile Ile Ala  Thr Glu Thr
    1340             1345              1350

Lys Gly  Asn Ser Asp Ala Ser  Ala Glu Ser Arg Ile  Thr Met Pro
    1355             1360              1365

Arg Lys  Glu Ala Ile Pro His  Ser Pro Ile Val Glu  Ala Asn Glu
    1370             1375              1380

Glu His  Val Asn Val Thr Ile  Ala Pro Asn Gly Glu  Thr Thr Gln
    1385             1390              1395

Ile Ala  Val Lys Tyr Arg Thr  Pro Asp Gly Gln Glu  Ala Thr Leu
    1400             1405              1410

Ile Ala  Ser Lys Asn Glu Ser  Ser Trp Thr Leu Asn  Lys Gln Ile
    1415             1420              1425

Asp His  Val Asn Ile Asp Glu  Asn Ser Gly Lys Val  Thr Ile Gly
    1430             1435              1440

Tyr Gln  Ala Val Gln Pro Glu  Ser Glu Val Ile Ala  Thr Glu Thr
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Lys Gly Asn Ser Asp Ala Ser Ala Glu Ser Arg Ile Thr Met Pro
    1460   1465   1470

Val Lys Glu Lys Thr Pro Ala Pro Pro Ile Ser Ile Ile Asn Glu
    1475   1480   1485

Ser Asn Ala Ser Val Glu Ile Ile Pro Gln Val Asn Val Thr Gln
    1490   1495   1500

Leu Ser Leu Gln Tyr Ile Asp Ala Lys Gly Gln Gln Gln Asn Leu
    1505   1510   1515

Ile Ala Thr Leu Asn Gln Asn Gln Trp Thr Leu Asn Lys Asn Val
    1520   1525   1530

Ser His Ile Thr Val Asp Lys Asn Thr Gly Lys Val Leu Ile Asn
    1535   1540   1545

Tyr Gln Ala Val Tyr Pro Glu Ser Glu Val Ile Ala Arg Glu Ser
    1550   1555   1560

Lys Gly Asn Ser Asp Ser Ser Asn Val Ser Met Val Ile Met Pro
    1565   1570   1575

Arg Lys Thr Ala Thr Pro Lys Pro Pro Ile Ile Lys Val Asp Glu
    1580   1585   1590

Met Asn Ala Ser Leu Ala Ile Ile Pro Tyr Lys Asn Asn Thr Ala
    1595   1600   1605

Ile Asn Ile His Tyr Ile Asp Lys Lys Gly Ile Lys Ser Met Val
    1610   1615   1620

Thr Ala Ile Lys Asn Asn Asp Gln Trp Gln Leu Asp Glu Lys Ile
    1625   1630   1635

Lys Tyr Val Lys Ile Asp Ala Lys Thr Gly Thr Val Ile Ile Asn
    1640   1645   1650

Tyr Gln Ile Val Gln Glu Asn Ser Glu Ile Ile Ala Thr Ala Ile
    1655   1660   1665

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Asn Gly  Asn Ser Asp Lys Ser  Glu Glu Val Lys Val  Leu Met Pro
    1670                 1675              1680

Ile Lys  Glu Phe Thr Pro Leu  Ala Pro Leu Leu Glu  Thr Asn Tyr
    1685                 1690              1695

Lys Lys  Ala Thr Val Ser Ile  Leu Pro Gln Ser Asn  Ala Thr Lys
    1700                 1705              1710

Leu Asp  Phe Lys Tyr Arg Asp  Lys Lys Gly Asp Ser  Lys Ile Ile
    1715                 1720              1725

Ile Val  Lys Arg Phe Lys Asn  Ile Trp Lys Ala Asn  Glu Gln Ile
    1730                 1735              1740

Ser Gly  Val Thr Ile Asn Pro  Glu Phe Gly Gln Val  Val Ile Asn
    1745                 1750              1755

Tyr Gln  Ala Val Tyr Pro Glu  Ser Asp Ile Leu Ala  Ala Gln Tyr
    1760                 1765              1770

Val Gly  Asn Ser Asp Ala Ser  Glu Trp Ala Lys Val  Lys Met Pro
    1775                 1780              1785

Lys Lys  Glu Leu Ala Pro His  Ser Pro Ser Leu Ile  Tyr Asp Asn
    1790                 1795              1800

Arg Asn  Asn Lys Ile Leu Ile  Ala Pro Asn Ser Asn  Ala Thr Glu
    1805                 1810              1815

Met Glu  Leu Ser Tyr Val Asp  Lys Asn Asn Gln Ser  Leu Lys Val
    1820                 1825              1830

Lys Ala  Leu Lys Ile Asn Asn  Arg Trp Lys Phe Asp  Ser Ser Val
    1835                 1840              1845

Ser Asn  Ile Ser Ile Asn Pro  Asn Thr Gly Lys Ile  Val Leu Gln
    1850                 1855              1860

Pro Gln  Phe Leu Leu Thr Asn  Ser Lys Ile Ile Val  Phe Ala Lys
    1865                 1870              1875
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Lys Gly  Asn Ser Asp Ala Ser  Ile Ser Val Ser Leu  Arg Val Pro
    1880             1885                 1890


Ala Val  Lys Lys Ile Glu Leu  Glu Pro Met Phe Asn  Val Pro Val
    1895             1900                 1905


Leu Val  Ser Leu Asn Lys Lys  Arg Ile Gln Phe Asp  Asp Cys Ser
    1910             1915                 1920


Gly Val  Lys Asn Cys Leu Asn  Lys Gln Ile Ser Lys  Thr Gln Leu
    1925             1930                 1935


Pro Asp  Thr Gly Tyr Ser Asp  Lys Ala Ser Lys Ser  Asn Ile Leu
    1940             1945                 1950


Ser Val  Leu Leu Leu Gly Phe  Gly Phe Leu Ser Tyr  Ser Arg Lys
    1955             1960                 1965


Arg Lys  Glu Lys Gln
    1970
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